DANCE SCIENCE AND SOMATICS IN TRAINING AND PERFORMANCE

by

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THESIS ABSTRACT

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This mixed methods investigation analyzes the effect of a novel somatics training program on dance skills. Fourteen dancers were divided into treatment and control groups. The treatment group participated in an eight-week workshop on the use of the spine utilizing sensory experiences, mini-lectures, and dance exercises. During entry and exit, all dancers learned two phrases by video containing the same motor-patterns with contrasting choreographic intents; Phrase A fluid, sustained and slow, Phrase B, dynamically enhanced. Participants performed each phrase for the camera, to be scored by a judging panel. Descriptive statistical analysis of judging data suggests the workshop positively affected their execution of skills in Phrase A, over B. Data reduction and interpretation of the participants' interviews, questionnaires, and journals yielded several themes. This study has vast implications, suggesting combination of dance science and somatics in dance as efficacious for dancers' experiences and execution of technical dance skills.

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CHAPTER I

INTRODUCTION

As dance became an accepted field of study in universities, dance educators gained opportunities to delve into research across disciplines. The result was an emergence of new fields of research, including dance science (Batson and Wilson 2014). The advent of dance science instigated inquiry acknowledging the physiological complexity involved in the act of dancing, which has led many educators to question how this body of knowledge is best applied in dance training (Batson, Quin, and Wilson 2011). In recent decades, many dance programs have incorporated another field, somatics, into their curricula. This can be viewed as a response to dancers commonly seeking out somatic practices as adjunct to their training (Batson 2009), including Body-Mind Centering®, Feldenkrais®, Alexander Technique, Bartenieff Fundamentals℠, Ideokinesis, Pilates, and more. Not only has somatics influenced dance curricula within the university, it introduced somatic-oriented pedagogy into technique classes. A somatic approach to pedagogy accentuates experimentation over replication, asks for attention to the whole self, and invites multiple routes of reflection within the container of a class (Lester 2015).

Brodie and Lobel (2011) distilled four fundamental principles underlying somatic practices to enable the application and integration of somatics into dance technique classes: breath, sensing, connectivity, and initiation. “Focusing attention on these processes can increase sensitivity, awareness, and responsiveness while moving. This state of consciousness can, in turn, improve dancers’ alignment and efficiency in addition to enhancing their class-taking and performance skills” (Brodie and Lobel 2011, 80).

Because contemporary dancers today seek training that is both efficient and effective for development of their technique, many educators are advocating for somatic approaches in dance training. Facilitating dance classes with a somatic approach offers individual dancers ownership of their movement, and seeks to embrace their experience to enable growth artistically and technically. "Encouraging this approach in technique as well as in exploratory activities can aid dancers in the integration and retention of new ways of moving. In addition, discovering and embracing one's own movement choices speaks to the artistry, not just the skill, involved in dance" (Brodie and Lobel 2011, 85).

Training to be a contemporary dancer is a curvy and uniquely individual path, as the eclectic nature of contemporary dance aesthetics demands dancers to possess both versatility and a strong foundation. It is advantageous for dancers to understand their movement potential to enable a reflexivity in their ability to adapt to different environments and movement aesthetics. Ehrenberg (2015, 49) highlights a distinguishing factor in contemporary dancers is not their ability to master steps, but a way in which they approach movement, or "kinesthetic mode of attention." Rarely now are contemporary dancers asked to learn codified forms, thus a sense of internal authority has evolved into part of identifying as a contemporary dancer.

Cognitive neuroscience offers scientific support for theories and practices which have been underpinning somatics for decades (Batson and Wilson 2014; Bläsing, Puttke and Schack 2010). Confirming the individuality of each dancer's movement patterning, neuroscience supports an important pillar in somatics: honoring the individual's experience. A somatic approach strives to offer students procedural knowledge, valuing process and experimentation over outcome (Barr 2002). Using this approach to facilitate

learning about scientific foundations can allow students an exploration of their own movement potential through a learning process. Motor learning research highlights motivation as a component facilitating change and integration of new skills, requiring time and attention to skill acquisition (Krasnow and Wilmerding 2015).

Combining science and somatics can take on many facades in the dance technique setting. Several scholars (Batson, Quin, Wilson 2011; Geber and Wilson 2010; Batson and Wilson 2014; Goodnight 2008; Daniels 2009) suggest the advantage to combining somatics and dance science. Both fields integrate information from anatomy, kinesiology, neuroscience, and motor learning into movement. In motor learning, transfer theory refers to "the use of knowledge, skills or competencies acquired in a previous context, being applied to a new or different context" (Fortin, Long and Lord 2002, 160). How can we utilize transfer to offer dancers efficient training to improve their technique? Is it about internal authority? And if so, how do we facilitate an understanding of the importance of internal authority in dance training? These questions led me to wonder if science and somatics influence the execution of dance skills. It is well established that the integration of somatics in dance effects the experience of the dancer, but no work has produced evidence it transfers to the execution of dance skills (Diaz, Chatfield and Cox 2011, Fortin, Long and Lord 2002; Meenan 2013; Roche and Huddy 2015).

Somaticists and scientists alike identify the spine as the "central organizing structure in the skeleton" (Clippinger 2016, 58). Its complex and versatile structure facilitates stability and mobility of proximal and distal function (Bartenieff with Lewis 1980; Clippinger 2016; Cohen 1993; Dowd 1981; Feldenkrais 1972; Hackney 2005; Olsen 1991). My background as a dancer, educator, Pilates instructor, student of

somatics, and movement enthusiast taught me the critical role that spinal organization, coordination, and integration play in movement patterning. Spinal coordination patterns can be isolated or integrated into movement, and are vital to efficient movement. My aesthetic values in creating, watching, or performing movement involve a distinct relationship to the use of the spine. I experience students' confusion about the spine through language used in dance technique classes such as "straight," "flat back," "lift," "arch," "contract," and "tuck." Often this language is used, and imitated, without an understanding of the complexity of structure and function, or the sensory knowledge required to execute the intended movement in a healthy and efficient manner.

Borrowing concepts and approaches from dance science and various somatic practices, this investigation involves two distinct, yet related inquiries. The first inquiry is whether taking a somatic approach to teaching and learning anatomy, kinesiology, and neuroscience will affect a dancer's subjective experience of technical skill execution of contemporary dance skills. Second, can this be seen by an observer? Geber and Wilson (2010) state, "information about the structure and function of the body can be employed to enhance an individual's performance" (51). How do we know?

Measuring skill execution in dance is a "slippery slope" (Chatfield 2009). Several studies on the integration of somatics in dance training highlight the missing link in this field of research in relation to the execution of dance skills (Batson 2009; Diaz, Chatfield and Cox 2011; Krasnow and Wilmerding 2015; Meenan 2013; Roche and Huddy 2015). Recently, other studies have used quantitative assessment tools to evaluate specific factors in dance (Chatfield 2009; Krasnow and Chatfield 2009; Angioi, Metsios, Twitchett, Koutedakis and Wyon 2009; Wilson and Kwon 2008), but none seek to

measure skill execution in relation to somatics. Research in motor learning and transfer theory suggests the importance of attention in transferring skills across contexts (Rosalie and Müller 2012; Wulf, Shea, and Lewthwaite 2010). Most often the "incorporation of somatics into dance programmes has more or less relied on 'wishful thinking,' leaving to the student, the responsibility of transferring acquired sensorimotor knowledge in daily dance training and performance" (Fortin, Long, and Lord 2002, 160).

Often, dance students enter higher education programs with little understanding of the "how," or process, of executing movement. They are trained to replicate skills and choreography with little attention to internal processes (Schupp and Clemente 2010). I became interested in working with both recreational and competitive studio-trained dancers in this inquiry, as I was finding my classroom full of students unfamiliar with attending to the process of movement execution. Attending to the process involves a new way of thinking about movement, and can require dancers to relearn how they accomplish a given skill. As dance educator and somaticist Sylvie Fortin (2002) suggests,

> Promoting a functional, self-referential and contextual aesthetic is tied to the goal of understanding personal organization in movement which in turn will facilitate acquiring someone else's style. It is not only the training itself that constructs the dancing bodies, but how the individual approaches his or her training. (173)

Through a mixed methods approach, this research uses qualitative and quantitative data collection to measure the effects of a somatic training program about the use of the spine on the execution of contemporary dance skills.

Statement of Purpose

The purpose of this study is to utilize a somatic approach to anatomy, kinesiology, and neuroscience in the teaching and learning of contemporary dance skills. Through this research, I will question if and how this knowledge can:

1) Affect a dancer's subjective experience of technical execution in dance skills.
2) Affect a dancer's technical execution of dance skills from an observer's point of view.

Definitions of Terms

Below, the following terms are defined for this research: contemporary dance, somatics, somatic approach, dance science, and spinal coordination patterns.

Contemporary Dance

Contemporary dance is a melting pot of eclectic movement aesthetics and training approaches. It draws from tenets of modern and postmodern dance, neo-classical ballet, improvisational practices and a breadth of other forms, empowering dancers to find a means of training to seek efficiency and expressivity without codifying steps into a particular training system. Often dancers are asked to "shed" their previous training, in pursuit of personal autonomy and versatility. This brings an inclusive energy, and requires dancers to formulate their own training package and identity to bring to a choreographic process (Bales and Nettl-Foil 2008, Strauss 2012).

Somatics

Batson and Wilson (2014, xv) suggest when referring to twenty-first century contemporary dance, "western contemporary dance from this period has been informed

and enriched by five decades of exchange with Somatics." The International Somatic Movement Education and Therapy Association's (ISMETA 2017) website states: "The field of somatics has developed over the last century through a process of inquiry into how consciousness inhabits the living body. The term is derived from the word "somatic," which means pertaining to the body, experienced and regulated from within." Sally Fitt (1996, 304) elaborates stating, "Using the word somatics to represent the systems meant that body, mind, spirit and environment were finally all represented in the name." Integrating somatic experiences into the technique class, and into dance curricula is common to supplement dance training. Brodie and Lobel (2011) distilled four fundamental somatic principles central to many somatic practices. These are identified as breath, sensing, connectivity, and initiation. In this research, I utilized these four principles in the workshop, in conjunction with content from various somatic practices.

Somatic approach

Somatics has also entered into dance training by influencing dance pedagogy. Kelly Lester (2017), in a recent article "Somatics: A Buzzword Defined," states, "the commonalities among somatic movement experiences become apparent in the focus on experiential and functional anatomy, attention to habitual movement patterns, developmental processes, hands-on body work, empathetic communication (verbal and nonverbal), and self-reflection" (32). "To teach movement from a somatic perspective, one might accentuate experimentation over replication, attend to the whole self (thinking, sensing, feeling, and intuiting), or invite multiple routes of reflection" (Lester 2015, 95). Pamela Geber and Margaret Wilson (2010) state:

> *A somatically-oriented approach to teaching about the body includes*: 1) valuing and nurturing each student's individual perspective and sense of herself as a thinking and feeling mover; 2) valuing and nurturing each student's ability to look at herself from the inside-out, where one is aware of feelings, movements and intentions, rather than looking objectively from the outside-in; 3) providing students with ways of working rather than end-goals; and 4) honoring and working from multiple styles of learning in class. (55)

Dance Science

In their recent book, Batson and Wilson (2014) clarify that dance science is a term that includes several scientific disciplines in the effort to "establish a scientific foundation for dance teaching and performance" (7). Included in this list are "sports and exercise science, biomechanics and kinesiology, psychology, nutrition, anatomy, motor learning, motor control and motor development, orthopedics, rehabilitation medicine and other related fields" (Batson and Wilson 2014, 7). In this study dance science refers to anatomy, kinesiology, and neuroscience in direct relationship to the spine.

Spinal coordination patterns

Integration of the spine entails spinal coordination patterns including flexion, extension, hyperextension, lateral flexion, rotation, undulation, differentiation, and translation.

Delimitations

While my interests, and the implications of this study, can be viewed through a pedagogical lens, I chose not to focus on pedagogy in this research. I focus on the data provided by the participants and judges. The training workshop focuses on the participant's experiences to analyze self-perceived improvement, and including judges in the quantitative methodology measures improvement from an observer's standpoint.

I sought intermediate recreational and competitive studio-trained dancers to participate in this study. The requirements to participate included 2+ years of studio training, as I sought participants who had experience with a contemporary, competitive, or jazz-based dance aesthetic. Many students I encounter in the university setting come from this background, and I am constantly striving to find a way to communicate with them in the learning process. I created movement material that was challenging and aesthetically pleasing in its use of shape, line, movement vocabulary, and dynamics as a motivational factor for these dancers who are accustomed to flashy content, and dynamic range. The choice to focus on the spine and the nature of the movement material was built around my movement preferences and proclivities.

Additionally, upon entry and exit participants learned movement from a video recording. They were allotted twenty minutes with the video, and full control of the television. Learning from a video is a distinct skill itself. This could be a disadvantage, as many struggle to learn movement without verbal cuing and skill breakdown.

Biases

As the facilitator and researcher, my values and biases, movement aesthetic, and background are woven into every facet of this study. My identity as a contemporary dancer stems from my eclectic collegiate experiences, weaving modern dance, a breadth of other genres, and somatic practices together to seek efficiency and versatility in my movement aesthetic. My fascination with the body began as a teenager in yoga classes, continued in my collegiate dance experience, and through my Pilates certifications. Since then, I have experienced several workshops and courses in various somatic methods,

primarily Body Mind Centering®, Feldenkrais®, Bartenieff Fundamentals℠, and Pilates. My fascination with dance science, particularly anatomy, kinesiology, and neuroscience, colors my teaching and learning in dance.

Limitations

A major factor out of my control was the participants' diverse involvement outside of this research. I had limited control of these extraneous variables that may affect the outcome of the study. This study took place over Fall Term 2016, therefore some dancers had just taken a summer off from dancing, and some stayed active. The duration of the training workshop was eight weeks, consisting of fourteen sessions because of two holidays. I recognize this is a short period of time for substantial change to occur in the participants' skill execution.

The participants spent between 0-30 hours in a dance studio during this study. Across the participant pool, prior experience with anatomy, kinesiology, and neuroscience ranged. Some participants were taking course offerings from the University of Oregon Department of Dance such as Dance Somatics, and Anatomy of Movement concurrently with this research. Lastly, I want to recognize the challenge in utilizing video as a measurement tool in dance performance. A live dancer evokes a different experience for an observer, however for the sake of this research, video was used for continuity, time, and control in both the learning process and the judging panels.

Significance of Study

Since the introduction of somatics as a component of dance training, "dance researchers have studied the relationship between somatics and the creative process, somatics and the empowerment of dance student, and somatics and the empowerment of dance teachers. Still, there is little published research that documents the results of such practices" (Diaz, Chatfield and Cox 2011, 80). Many are questioning the effect of somatics in dance training including Margaret Wilson (2007, 49) in her dissertation, "one of the questions I had when first embarking upon this research asked if the embodiment of anatomical information would enhance the artistry of the dancers' performance."

While a wealth of research in neuroscience and motor learning exists about transfer theory, there is little research pairing transfer with somatics and dance performance. "Transfer refers to the uses of knowledge, skills or competencies acquired in a previous context, being applied to a new or different context" (Fortin, Long and Lord 2002, 160). When situated in dance, transfer is a complicated inquiry, as a contemporary dancers' training is eclectic, and rarely do precise methods of training coincide with performance. Somatic methods and a somatic approach in the classroom are suggested to affect a dancer's experience in their training (Batson and Schwartz 2007; Batson, Quin and Wilson 2011; Brodie and Lobel 2004; Diaz, Chatfield and Cox 2011; Dragon 2015; Ehrenberg 2015; Fortin, Long and Lord 2002; Geber and Wilson 2010; Hancock 2015; Lester 2017; Meenan 2013; Roche and Huddy 2015). Glenna Batson (2009, 4) states, "The challenge is for researchers to show the precise ways that somatic practices bear directly on improvement in technique and performance. Future 'pioneers' will be those who take somatics to this next stage in the dance science literature."

Recent researchers at the University of Oregon (Diaz, Chatfield, and Cox 2011; Meenan 2013) acknowledge their lack inclusion of an evaluation tool. Diaz, Chatfield, and Cox (2011, 93) conclude, "though participant reports indicated changes in performance of dance phrases after ATM *(*Awareness Through Movement) lessons, outside evaluation of these changes was not performed. Future research seeking to assess improvement in performance and/or skill acquisition may give additional support for the incorporation of somatic practices in dance training." Similarly, Melanie Meenan (2013, 86) suggests, "Further research inquiries could include consideration of how exposure to a somatic dance environment could affect a student's outlook on dance, influence class taking strategies at various levels or stages of training, be applied to performance, or lead to various levels of success in professional dance accomplishments."

In the end, the question of how knowledge of dance science and a somatic approach to teaching and learning affects dancers recurs throughout literature on somatics and dance training. Roche and Huddy (2015, 157) call for "further longitudinal research into the role of somatics within tertiary dance training, and the value of its application to not only the acquisition of dance skills but also the development of creativity and the growth of the performing dance artist." Dance educators are constantly questioning how to offer students the best training and education in contemporary dance; therefore, this study supports this inquiry by offering evaluation by a panel of judges to assess observable improvement of performance skills as a result of somatics-infused dance training.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The following chapter presents a review of current literature on dance science and somatics to support the mixed methodology design of this research. First, I provide support for using a somatic approach in teaching scientific foundations present in anatomy, kinesiology, and neuroscience, then relate it directly to this study. Next, I review literature in motor learning and control, somatics, and dance science to suggest how this training program could be efficacious for the student's experience and improvement in their execution of technical dance skills.

Contemporary dance demands versatile dancers. It is advantageous for dancers to understand their movement potential and limitations, and be reflexive in their ability to adapt to different environments and movement aesthetics. Shantel Ehrenberg (2015) highlights a distinguishing factor in contemporary dancers is not their ability to master steps, but a particular way they approach movement. Often, new dance students and majors enter dance in higher education with little understanding of the 'how' or process of executing movement, and are trained to find form with little attention to sensation (Schupp and Clemente 2010). Dance educators and somaticists Sylvie Fortin, Warwick Long, and Madeline Lord (2002) suggest,

> Promoting a functional, self-referential and contextual aesthetic is tied to the goal of understanding personal organization in movement which in turn will facilitate acquiring someone else's style. It is not only the training itself that constructs the dancing bodies, but how the individual approaches his or her training. (173)

Based on a mixed-methods design, this research utilizes both quantitative and qualitative inquiry and analysis (Berrol 2012). Cynthia Berrol (2012, 242) states "…quantitative designs examine what happens when a particular phenomenon is acted upon by a measuring the observable effects, and that qualitative modes focus on why, exploring and explaining the underlying processes shaping the events… Each method serves to amplify and inform the other in a complementary union." In this study, the combination of concepts, theories, and methods grounded in science are combined with somatic approaches in dance training to question their effect on an individual's performance. Pam Geber and Margaret Wilson (2010, 51) state, "information about the structure and function of the body can be employed to enhance an individual's performance." How do we know? And from whose point of view? Including the perspectives of both judges and participants, as well as three discreet variables to measure skill improvement, this study aims to provide an investigation of these questions.

Combining Science And Somatics

The influx of published literature in the fields of dance science and somatics, motor learning and control, and neuroscience in dance over the past two decades (Batson and Wilson 2014; Bläsing, Puttke and Schack 2010; Krasnow and Wilmerding 2015) offer an exciting opportunity for analysis. Dance entered the academy by way of physical education in the early twentieth century. In the past thirty years, dance science has developed into an interdisciplinary field of its own, settling into most dance programs. "In the effort to establish a scientific foundation for dance teaching and performance, dance scientists sought to find a rationale for safe and effective dance training within

scientific theory" (Batson and Wilson 2014, 7).

Since the evolution of the field of dance science, many dance programs have incorporated another field, somatics, into their curricula. A field that stands entirely on its' own, "somatic practices encourage an integration of science into movement practice by introducing the process of exploring one's own anatomical capabilities and the act of acknowledging the nervous system as critical components for change" (Krasnow and Wilmerding 2015, 3). In many ways, somatic experiences are about self-awareness, attention and the unifying nature of acknowledging mind, body, spirit, and environment (Fitt 1996). In her recent article "Somatics: A Buzzword Defined," Kelly Ferris Lester (2017) writes,

> In many ways, somatic experiences can be akin to self-awareness, but somatics as a genre is much more complex than this. An individual observes his or her state of being in the present moment with a sense of nonjudgment, and then invites a process of self-reflection and consideration of positive change. The change might be on a physical level, such as releasing a tense muscle, on a nervous system level of integration, or a mental level of stress relief. (32)

Somatic practices have evolved as both 'receptive' therapies, or active experiences requiring the "conscious cooperation of the person through movement awareness or imagination" (Batson 2009, 1). Many dancers seek out these practices as adjunct to their training, and many teachers draw their experience with somatic practices into their pedagogy. A point of convergences for contemporary dance training and somatics is in their support and engagement of the individual's experience.

Dance programs have woven both science and somatics into curriculum hiring faculty who specialize in both of these fields, and requiring courses in both dance science and somatics for dance majors. To assist in this integration of somatics and dance training, Julie Brodie and Elin Lobel (2011) defined four fundamental principles

underlying most somatic practices: breath, sensing, connectivity and initiation. This lens to view somatics allows educators who may not specialize in one somatic method the ability to utilize somatic approaches in the classroom.

While still seemingly separate fields, both scientists and somaticists agree, that knowledge of the body enhances an individual's training. In fact, recent literature (Batson, Quin and Wilson 2011; Batson and Wilson 2014; Daniels 2009; Geber and Wilson 2010; Krasnow and Wilmerding 2015; Wilson 2007) suggests that combining dance science and somatics is advantageous to the dance student.

> Somatics opens us up to the world of actuality (an opening to the possible) and dance training opens us to the possibility of expanding our notion of being in the world. Dance science tends towards a different lens - -looking at the mechanics of movement, physiology and psychology as a means of optimizing our dance training and performative goals. Combining somatics and dance science provide a more comprehensive understanding for dance training that could feed and progress our dance practices. (Batson, Quin and Wilson 2011, 187)

In contemporary dance, educators seek means of training that are efficacious for improving dancers' technical skills. Within this process is a convergence of skill and artistry for each individual, often framed as embodiment. "This notion of embodiment helps validate first-person narrative and frames it within scientific parlance, and provides context for thinking about the integration of dance science and somatics in theory and in practice" (Batson, Quin and Wilson 2011, 186).

When the aim of training dancers is technical skill improvement, several factors are at play. Re-patterning of habits, finding new ways of moving, or improving the execution of a movement are a few of many desires. Combining scientific foundations with a somatic approach can assist dancers in this process. "Somatic approaches help the

individual find balance between tension and stress, efficiency and economy, and understand the natural aesthetic in movement" (Geber and Wilson 2010, 52).

Melanie Meenan (2013) in her Master's thesis at the University of Oregon suggests the practice of dance itself is inherently somatic. She defines dance technique as no longer the *what* but the *how* of dancing. In support, Glenna Batson and Margaret Wilson (2014, 6) state, "within dance, this kind of attention shifts consciousness away from the *what* of learning (the steps or vocabulary) and to the *how* (bodymind processes)."

A Somatic Approach For The Whole Dancer

Heidi Diaz, Steven Chatfield and Jan Cox (2002, 82) state, "Teachers incorporating somatics into dance training found that somatic practices offered them a teaching model in which the student is the central focus and classes are based on movement and somatic concepts versus pure skill acquisition and rote repetition." A somatic approach offers students procedural knowledge, valuing process and experimentation over outcome. Using this approach to facilitate learning can allow students an exploration of their own movement potential and limitations through a learning process by putting their experiences into action, honoring both subtle, sensory experiences and gross motor skill. "The very nature of procedural knowledge supports students' sense of self while encouraging them to be more active in their own learning" (Barr 2002, 42). Such an approach to learning in dance puts ownership on each individual dancer both in how they experience and think about dance in theory and in practice. While "the basis for training is skill acquisition" (Daniels 2009, 8), dancers are

empowered by an internal sense of knowing in their movement. Wilson (2007, 2) states, "a dancer can better understand movement when she recognizes how her body is helping create the actions she desires."

Attention

Contemporary dance now requires a specific kind of attention, enabling dancers to participate in the culture, or environment (Ehrenberg 2015). Much of this environment is an exploratory, process-based laboratory atmosphere (Stanton 2011). This framework still begs skill acquisition, but the learning process becomes equally as important to the achievement of new skills. Honoring this process is still somewhat philosophically revolutionary in dance education. Batson (2009, 6) states, "somatic education differs first from traditional dance pedagogy in its philosophical basis – that of dismembering mind-body dualism in pursuit of personal autonomy."

Training to affect change in the cognitive and neuro-motor systems takes time, and openness from the dancer. Moshe Feldenkrais (2010) emphasizes the challenge in fostering change in skill, a process now supported by cognitive neuroscience. He states,

> Real change has to be brought about in a way which allows both the body and the psyche to be changed simultaneously. If the approach is not integral but through either the psyche or the body separately, the change will last only as long as the person has not lost the awareness of it, and has not resumed spontaneous habitual patterns. (30)

A focus on the external effects and aesthetic of a movement may increase the automaticity of application, but this is after a significant learning process has occurred (Wilmingham 1998). Actual physical experience is a necessary prerequisite for robust activation in the brain's action observation network, but once this has occurred, provides

a reference point for further learning (Bläsing, Puttke and Schack 2010). Once the movement is integrated and processed into the somato-sensory nervous system, it becomes automatic, but significant attention, practice and time are part of this process of drawing a motor skill from conscious to unconscious control. This suggests the importance of the internal experience, as each action is an outcome of previous internal processing in the nervous system.

> Nowadays, a motor representation is understood as a dynamic unit that can be modified by experience. This representation will be the core of an assembly of relationships between different sensory and motoric components. An action representation will be designated by internal or mental content related to the intention to act, action goals, or the knowledge of either physical or more general consequences of a given action, to the covert neural operations that are supposed to occur before an action begins and the physical implementation of motor commands into the muscles. (Bläsing, Puttke and Schack 2010, 155)

The next step in the skill integration involves directing attention to the effect of the movement which "should result in greater effectiveness and efficiency" (Wulf, Shea and Lewthwaite 2010, 79).

> More specifically, a focus on the movement effect promotes the utilisation of unconscious or automatic processes, whereas an internal focus on one's own movements results in a more conscious type of control that constrains the motor system and disrupts automatic control processes. (Wulf, Shea and Lewthwaite 2010, 78)

Acknowledging the importance of both conscious and unconscious modes of attention in learning and performance is important in the integration of new skills. Dancers all possess a set of patterns that take time and motivation to change. Until that happens, careful attention needs to be paid to integrating new patterning, although this initially may not positively influence performance.

Motor Learning and Motivation

Chatfield (2003) measured inter-subject variability and intra-subject variability in dancers using electromyographic and kinematic measurement. He showed that each dancer employs a completely different neuromuscular strategy to accomplish a given task. Wilson and Young-Hoo Kwon (2008) agree in their study on biomechanics:

> Understanding that each individual dancer has a unique pattern of muscle recruitment in the performance of any given movement is crucial in training dancers. The movement may appear to be the same, but the subtle internal choreography of the muscles moving the bones is as distinctive as the individual dancer. (6)

Neuroscience now offers scientific support for theories and practices which have been underpinning somatics for decades (Bläsing, Puttke and Schack 2010). Applying this in the dance training environment requires the recognition that each dancer has a different means of self-organization in accomplishing the execution of a dance skills, or putting knowledge into action (Warburton 2011).

Research in motor control highlights the critical role of motivation in learning (Krasnow and Wilmerding 2015). Wilson (2007, 254) supports this in stating, "Movement is the context, curiosity is the catalyst: wanting to know, needing to know (for example as a dancer is trying to rehabilitate from, or avoid, an injury), and wanting to understand, perhaps to further artistic growth."

In her studies of the integration of the Feldenkrais Method® into tertiary dance training in the UK, Dianne Hancock (2015) noted personal relevance as a significant motivational factor in students' engagement with the practice. Hancock tells a story of Feldenkrais providing a lecture to dance students at NYU in 1971. Despite the depth of his philosophical ideas, the dancers did not engage with his lecture until he mentioned

that he could help them learn how to do the splits. Once he offered students an identifiable goal, they were engaged with the material (Hancock 2015). This is further emphasized in Hancock's article by Feldenkrais teacher Daniele Sanderson's notion of a "Wow Lesson." She suggests for students to be motivated to involve themselves in the lessons, "you've got to tap into what it is that they want out of it" (Hancock 2015, 165).

Motivation is a critical part of initiating change. Each student seeks different motivation, however often providing anatomical support for why change is important can clarify reasoning for students.

> Changing habitual patterns is a complex process, and different approaches work for different dancers. Probably the common element across all dancers who succeed at this task is motivation. If dancers are committed to the old approach and do not see a strong purpose to make changes, it is unlikely that the habit will be altered. For some students, a discussion of the anatomical basis for changing what they are doing and the potential injuries that the habit might cause is a successful method of motivating change. (Krasnow and Wilmerding 2015, 261)

Health and longevity are things we often hope to promote through suggesting change in habits, but change can also mean skill improvement, an excellent motivational factor.

Transfer Theory

The creation of this study's methodology began as an inquiry into transfer theory, or, "the uses of knowledge, skills or competencies acquired in a previous context, being applied to a new of different context" (Fortin, Long and Lord 2002, 160). While researchers posit that somatic training effects dance skills, "incorporation of somatics into dance programmes has more or less relied on 'wishful thinking,' leaving to the student the responsibility of transferring acquired sensorimotor knowledge in daily dance training and performance" (Fortin, Long and Lord 2002, 160). Integration of these approaches is

shown to give students a greater sense of internal authority and ownership of their own training, but it is yet to be determined if there is any transfer to the performance of dance skills (Diaz, Chatfield, and Cox 2011). Peggy Hackney (2003, 22) writes about the effects of Bartenieff Fundamentals[sm] on dance training stating, "fundamentals provides the possibility for movers to expand their movement range by mastering each basic pattern and then learning to interweave them rapidly, phrasing with the subtlety required in highly technical movement." She is suggesting a stage in the process of transfer that puts the responsibility on the dancer in the integration into performance.

Several studies on somatics in dance training (Batson and Schwartz 2007; Diaz, Chatfield and Cox 2011; Krasnow and Wilmerding 2015; Meenan 2013; Roche and Huddy 2015) highlight this missing link in this field of research in relation to skill execution. It is shown that the integration of somatics in dance affects the experience of the dancer, and merely suggested that it transfers to the execution of technical skills.

The Spine

Dance somaticists and scientists alike identify the spine as the "central organizing structure in the skeleton" (Clippinger 2016, 58). Its complex and versatile structure facilitates stability and mobility of proximal and distal function (Bartenieff with Lewis 1980; Clippinger 2015; Cohen 1993; Dowd 1981; Feldenkrais 1972; Hackney 2005; Olsen 1991). The peripheral nervous system emerges from the entire length of the spinal cord, to innervate bones, joints, organs, fluids, muscles, and connective tissue. Spinal coordination patterns can be isolated or integrated into movement, but regardless, are vital to efficient movement in dance. The continuity of movement often emerges from a

responsive spine, influencing the alignment and function of both upper and lower extremities (Clippinger 2015; Olsen 1991). Bonnie Bainbridge Cohen (1993) states,

> It is through Spinal Movements that we discover the vertical axis of our bodies and utilize the horizontal plane. They help us to differentiate our front from our back and are a base for the exploration of the space both inside our bodies and within our personal kinesphere. These patterns underlie the qualities of strength or lightness in our movement and are the ground from which we develop our inner and outer *attention.* (142)

A singular focus in the training workshop for this thesis study allowed for a singular focus in both verbal language, and movement vocabulary. Wilson (2007) found in her research that providing students with a common verbal language of somatics and anatomy gave them a way to understand structure and function and, in turn, express sensation in their discussions and journaling rather than leaving interpretation to the individual. She states, "the clarity of communication of both the image and the dancer's expectations are vital" (Wilson 2007, 62).

My aesthetic values in creating, watching, or performing movement involve a distinct relationship to the use of the spine, as I have felt changes in my experience and abilities to execute movement as my knowledge of the spine has deepened. Karen Clippinger (2015, 58) supports the focus of this thesis study stating, "many dance movements require exceptional spinal flexibility, complex coordination of muscles and keen attention to alignment to achieve the desired aesthetics of the movement. Hence, a better understanding of spinal anatomy and function, including both how to move and how to stabilize the spine, can enhance dance skill." The spine enables more than physical experience, as it is woven deeply into psychology as a part of the whole-self. Such an idea is confirmed by Hackney (2003),

> Quite a bit of my joy in kinesthetic identification comes from sensing a lively spine. Conversely, when I notice that I am not enjoying watching a mover, I frequently then become aware that the person's spine is not fully involved. The person may be maintaining a fixed relationship in the head-neck area, which cuts the head off from receiving movement impulses. Or often the person is holding a set relationship in the lower back so their tail and pelvis seem rigid. I also notice that some people hold the chest forward and up by setting the lower thoracic spine. All patterns of holding cut down on the fluid nature of the movement and, hence, the possibilities that are available at any one moment. All of these holding patterns are there in an individual for a reason. That reason could be physiological or psychological, genetic or environmental, but whatever the original cause, making changes in spinal patterning will lead to profound changes in the individual and his/her relationship to the world. Because the spine is in some sense the bony structural element physically at the individual's core and, hence, core to the nature of the individual, the changes may be thrilling or scary—probably both. A small change in availability of any part of the spine for movement will mean the possibility of a large change in the possibilities at the distal end of the limbs. (96)

Quantitative Assessment in Dance

A challenge of measuring the effects on transfer from learning to performance lies in facilitating the measurement of both quantitative and qualitative aspects of dance performance, and relating one to the other in meaningful ways. Chatfield (2009) states,

> ultimately, the qualitative assessment of dance technique—identifying the fundamental elements of dance and evaluating them in the context of a performing art—must be considered a slippery slope. Nonetheless, without evaluation of performance competency in dance, outcomes in dance research can be rendered useless in terms of their ability to detect and describe targeted performance goals. (108)

Donna Krasnow and Steven Chatfield (2009, 101) agree, "If dance researchers and educators want to measure and understand the effect of various training programs on dance performance, reliable systems for evaluating the qualitative aspects need to be developed." A challenge residing in research focused on learning and performance is "the often indirect association between learning and performance" (Stanton 2011, 87). Robert

Bjork (quoted in Stanton 2011, 87) summarizes this problem, "Substantial learning can take place during periods when few, if any, changes in performance are apparent; and substantial changes in performance during training may be accompanied by little, if any, learning." When utilizing quantitative methods of assessment in dance research, it is critical to consider the complexity of factors at play in duration, motor learning, and the individuality of each participant. Hackney (2003, 27) states, "movement is one of the best ways to approach change, because the essence of movement is change…changing old movement habits can take many months, even years."

In 2009, the *Journal of Dance Medicine and Science* published a special issue containing three articles that introduced methods to evaluate achievement in dance. Chatfield (2009) introduced the "Aesthetic Competency Evaluation" (ACE) modeled to evaluate proficiency in dance. His study assessed the "inter-judge agreement, intra-judge reliability, and the specificity and sensitivity of a qualitative test for analyzing dancers' training and performance capabilities" (Chatfield 2009, 108). Chatfield used five population samples (non-dancer, beginning, intermediate, advanced, professional) and scored them using three levels of achievement on four factors (technique, space/time/energy, phrasing, presence) using the Progressive Proficiency Table (Chatfield 2009, 110). This test yielded high levels of specificity and reliability. Its intent was not to measure improvement of skill, rather assess proficiency of current abilities.

Krasnow and Chatfield (2009) designed the "Performance Competence Evaluation Measure" (PCEM) after Chatfield's ACE model to measure qualitative aspects of dance performance. Her study measured four detailed factors including full body involvement in movement, body integration and connectedness in movement, articulation of joints and

body segments, movement skills in dance, and overall proficiency. Each factor was subdivided into multiple categories and scored using a three-point scale. Krasnow had twenty participants in her study, and used video recording to collect data at two different times. She first recorded students performing a contemporary dance phrase at the beginning of a university term, and then eight weeks later after they had been participating in classes and rehearsals consistently. The participants were videotaped in three trials of the sequence both times. Krasnow had three judges and, prior to the trials, provided two training session where they viewed both low and high scoring dancers. To provide a measure for inter-rater reliability, ten of the trials were repeated in the watching sessions. She reported improvement in all but two dancers, and a strong inter-judge and intra-judge reliability rating (Krasnow and Chatfield 2009).

Last a study to measure competency in dance performance measures the association between physical fitness and dance performance (Angioi, Metsios, Twitchett, Koutedakis, and Wyon 2009). The researcher's assessment criteria for dance included seven factors they found to be the "most frequently used criteria by pre-professional dance institutions and professional companies in auditioning dancers" (Angioi, Metsios, Twitchett, Koutedakis, and Wyon 2009, 116). These included: 1) control of movements, 2) spatial skills, 3) accuracy of movements, 4) technique, 5) dynamics/timing/rhythmical accuracy, 6) performance qualities, and 7) overall performance. Variables were measured on a scale of 1-10 (Angioi, Metsios, Twitchett, Koutedakis, and Wyon 2009, 116). A component of this study was to test the reliability of the assessment tool, however again, there was no attempt to measure improvement of skill execution.

Conclusion

Contemporary dance is a melting pot of eclectic movement aesthetics and training approaches. Dance educators Bales and Nettl-Foil (2008) suggest that no longer does one form of dance training support performance. As dance educators, we need to acknowledge the importance in providing students with tools to understand themselves in movement. This also promotes value in dance science, and a somatic approach to teaching and learning in contemporary dance.

This thesis study ties together concepts from dance science, somatics, motor control and contemporary dance techniques to analyze the effects of a somatics-based training program about the spine on the overall execution of dance skills from the experience of the dancer and the observation of a viewer. It is posited that dancers will benefit from the integration and application of anatomical information into one container—themselves (Krasnow and Wilmerding 2015). Daniels (2009, 8) states, "As dance educators, we can give dancers four important tools to develop artistry and physical mastery: conceptual understanding of anatomically sound dance technique; refined perceptual awareness; knowledge and understanding of how to work with one's own body; and a strong sense of self." After all, what most dancers strive to experience is dancing, and training is a means to hone, change and enable this experience. Wilson (2007, 243) states, "when an understanding of a movement, a quality or a physical understanding of how the body operates is integrated into a dancer's movements—becomes embodied—the dancer transcends knowledge and develops knowing. When this information is applied in action, the dancer transcends dance and experiences dancing."

CHAPTER III

METHODOLOGY

This mixed methodology investigation combines a quantitative and qualitative approach to data collection and analysis (Berrol 2012; Marshall and Rossman 1995). This thesis research was approved by the University of Oregon Institutional Review Board (IRB) and Research Compliance Services to involve Human Subjects on August 15, 2016. All data was collected from 14 participants and three judges. This study had eight phases: study preparation, entry process, the workshop, exit process, assessment tool creation, judging panel preparation, judging panels, and data analysis. This chapter clearly outlines these seven phases of research.

Study Preparation

In preparation for this study, I choreographed two one-minute dance phrases (Phrase A and Phrase B) based on coordination patterns of the spine and their integration into contemporary dance movement. Phrase A and Phrase B contain the same weight shifts and coordination patterns of the spine, but in a different order. They differ in dynamics and choreographic detail. Phrase A is full-bodied keeping the action close to the core and executed with a sustained and fluid quality. Phrase B's quality is best described as explosive and quick, with an emphasis on the limbs to execute peripheral spatial patterning integrated into the spinal coordination patterns.

I travelled to Bellingham, Washington twice to teach an expert dancer Phrase A and Phrase B to serve as the expert example for use in calibrating the judges, and for the learning video in entry and exit processes. For each phrase, I created an eight-minute

video of the expert dancer repeating the phrase containing a mixture of the dancer towards and away from the viewer. This enabled the assisted participants in the learning phase of entry and exit. The expert dancer performing the phrase on the video was unfamiliar to all participants.

The study took place during ten weeks of Fall Term 2016 at the University of Oregon. Recruitment of participants was through approved email scripts and flyers (see Appendices G and H). Students were eligible to participate in this study if they were a first, second or third year undergraduate between the ages of 18-25 with two or more years of recreational or competitive studio dance training. They were not eligible if they had no studio dance training, four or more years of dance in higher education, or were over 25 years of age. My intention in working with this demographic was to involve dancers who may not have been exposed to somatic approaches in the technique setting, or have limited experience with the relationship of dance science to dance training. Majority of participants joined after receiving a personal email. I knew all but one participant prior to the study through the Department of Dance at the University of Oregon. There were seven participants in the control group and seven participants in the treatment group. Only six of the participants in the treatment group completed the study. Ann removed herself towards the end of the study due to illness. She completed the exit interview and questionnaire, but did not finish the workshop or perform in the exit process. Participants were not provided compensation for their time or efforts. See Table 1 List of Participants.

The entire duration of the study was video recorded. The environment in which the dancers were recorded remained the same in both the entry and exit process, and the

workshop. The camera remained in the space throughout the study to video record each session.

Table 1 List of Participants

	Pseudonym	Group
1	Alexa	Control
2	Jo	Control
3	Joelle	Control
4	Katie	Control
5	Riley	Control
6	Sala	Control
7	Tiberius	Control
8	Colleen	Treatment
9	Emma	Treatment
10	Kay	Treatment
11	Lily	Treatment
12	Marie	Treatment
13	Skylar	Treatment
14	Ann	Treatment

Entry Process

The entry process took place as follows:

- I scheduled an individual meeting with each participant. This initial meeting included collection of consent materials (Appendix J), and a video-recorded entry interview (Appendix C).
- Next, participants came in randomly assigned pairs to a 90-minute entry session in the evening in two dance studios in Gerlinger Annex. They were asked to wear nude (or light colored) clothing and be ready to dance prior to their scheduled entry time.

- Randomly chosen Participant 1 went into the learning studio for 20 minutes with a task to learn Phrase A from a video on loop while Participant 2 waited. Participants could manipulate the computer connected to the video to rewind, pause, or fast forward the video loop. Participants had no prior knowledge of the content or focus of the phrase.
- After 20 minutes, Participant 1 was brought into an adjacent performance studio for performance of the one minute phrase while Participant 2 went into the learning studio for 20 minutes to learn Phrase A.
- Participant 1 was given three attempts to perform Phrase A for the camera to the best of her abilities. She was encouraged to finish the phrase even if she made errors, and she was allowed short breaks between performances. I was in the studio video recording each attempt. I did not coach the participants, but allowed them brief pauses to review sequence, if needed.
- After Participant 1 finished performing Phrase A, she was allowed rest-time until Participant 2 was finished with her 20 minutes in the learning studio.
- Participant 2 entered the performance studio, and Participant 1 returned to the learning studio to learn Phrase B for 20 minutes from the learning video.
- The same performance cycle for Phrase A occurred for Phrase B.
- When the participants were through performing Phrase A and Phrase B, they were provided an entry questionnaire (Appendix B).

After completing all participant entry, I used an online randomizer to place the participants in two groups: control group, and treatment group. The treatment group participated in a workshop Monday/Wednesday 6-7:30 pm for the following eight

weeks. The control group returned to participate in the exit process. As a few participants had time conflicts with the workshop, in randomizing the groups were chosen as "control" or "treatment" based on which group had the least participants with conflicts. The remaining one participant with a conflict was placed in the control group, and replaced in the treatment group by a randomly selected member of the control group. Participants were notified of their placement and the workshop began the following Monday.

The Workshop

The focus of the workshop was the use of the spine in contemporary dance. The workshop progressed through body systems applied to the spine including bones, joints, muscles, nervous system and fascia. Each session consisted of a mix of sensory experiences, readings, visual images, experiential work, conversations, journaling, improvisation, and dance phrases. The final two sessions were technique classes based on the content covered in the workshop. All dance phrases in the workshop were embedded with concepts and spinal motor patterns from Phrase A and Phrase B, but no direct referral to the phrases was made. In each session, the participants journaled based on prompts I provided. A full content outline is detailed in Appendix D and briefly outlined in Table 2 (days 4.1 and 7.2 were holidays).

Table 2 Workshop Content Outline

Spinal Coordination	Theme	Content Overview
1.1	Introduction/Bones	Body scan, readings *Bodystories* (Olsen 1991) "Three Body Weights," find bony landmarks, partner "walking" on spine, improvisation
1.2	Bones	Review three body weights scan, Look at 3D skeleton model, readings *Anatomy of a Moving Body* (Dimon 2008), center/across the floor dance phrases
2.1	Joints/Articulation	Powerpoint of images, overview of actions, supine movement lab including movements from Feldenkrais®, Bartenieff Fundamentals and Pilates
2.2	Finding Center	Conversation, review movement lab from 2.1, rock standing and walk to find center, introduce concept of acture (Feldenkrais 1972), read from "Finding Your Center" (Dowd 1981) partners to find ideal alignment (Clippinger 2016).
3.1	Ligaments	Scan, X series, powerpoint images, spine video by Leslie Kaminkoff (2011), revisit X series, teach pliés, teach falling backwards phrase
3.2	Coordination	Partners throughout whole session, floating heads, walking/weight shift, X series, pliés, falling backwards phrase (all with partner feedback)
4.2	Actions (half absent, so did 2 separate sessions for make-up)	Supine warm up (pelvic clock and head clock), X series, introduce language for spinal actions into improvisation, pliés, revisit across the floor phrase (1.2)
Spinal Integration	Theme	Content Overview
5.1	Muscular System	Cue Bartenieff's Basic 6 by reading from *Body Movement* (Bartenieff with Lewis 1980), muscle improvisation, powerpoint of images, repeat muscle improvisation
5.2	Nervous System	Powerpoint, walking/weight shifts, Basic 6, new weight shift dancing phrase
6.1	Fascia/ Anatomy Trains	Look at Anatomy Trains (Myers 2014) posters, walking/balancing, X, pliés, partner work, revisit posters and trace trains, weight shift phrase with partner feedback

Table 2 continued

6.2	Fascia/ Technique Class	Revisit posters, Basic 6, X series, pliés, weight shift phrase, fascia improvisation, falling backwards phrase, teach six-step combination
7.1	Technique Class	Review journals and find personal themes, reference scan, X series, pliés (modify for circumduction), improvisation, weight shift phrase (faster), falling back phrase, fondu phrase, six-step phrase, reference scan
Choreographic Intent	Theme	Content Overview
8.1	Breath, Space, Time, Effort	Transfer chat, read from *Body Movement* (Bartenieff with Lewis 1980), experience/embody breath, space, time, effort in supine warm up, walking forward and backward, in travelling improvisation.
8.2	Transfer	Final technique class, cue for transfer: scan, X series, pliés, falling back phrase, fondu phrase, six step phrase, scan

Exit Process

After the completion of the workshop, all participants from the control and treatment groups took part in the exit process. This mimicked the entry process exactly, with an addition of the Exit Interview (Appendix C) into the 90-minute time slot.

Assessment Tool Creation

This study uses three discreet variables to measure the effects a somatic approach to anatomy, kinesiology, and neuroscience have on the execution of technical dance skills: 1) *Use of Spine*, 2) *Phrase Material Retention*, and 3) *Choreographic Intent* (see Table 3). While seemingly intertwined, each of these variables is intended to measure a different component of a dancer's performance. *Use of Spine* looks at the integration of the spine into each dancer's movement. The movement content in the phrases of the

workshop is built around spinal coordination patterns, and the use of spine as both a mobile and stable center; therefore, the execution of each skill is tied directly to the integration of the spine. *Phrase Material Retention* intends on measuring the dancer's use of spatial patterns and direction. *Choreographic Intent* is a measure of each dancers' aesthetic performance of the phrase material. The two phrases for measurement (Phrase A and Phrase B) differ in use of dynamics, and choreographic detail. Phrase A, while full-bodied, keeps the action close to the core with a sustained and fluid quality. Phrase B is explosive and fast tempo, using limb action as additional peripheral patterning integrated with the spinal coordination patterns present in Phrase A.

In the workshop, we worked on all three variables, although the spine was the focus of the content. The movement phrases we practiced in the workshop embedded movement patterns and concepts from Phrase A and Phrase B used for assessment while not referring to them explicitly. This enabled an inquiry into transfer of learning: would the dancers be able to apply their experience in the workshop into their performance for the camera? Would they see and transfer the movement we workshopped in both phrases in the exit phase?

Judging Panel Preparation

Implicit in any judging situation are the values and biases of the judges and the researcher. I took special care to create a tool for measuring the performance of the participants with three carefully define variables, and calibrated the judges on a Likert scale of 1-5 in relation to these variables (See Table 3). Prior to judging panels (referred to as viewing 1 and viewing 2), they participated in two calibration sessions to clarify and

finalize the scoring variables and scale outlined in Table 3, and the final Skill Scoring Rubric (Appendix A). The first calibration session lasted three hours, and the second session lasted 90 minutes. In the first calibration session, I:

- Taught the judges Phrase A and Phrase B
- Provided the judges a preliminary scoring rubric
- Showed videos of dancers outside of the participant group performing Phrase A and Phrase B representing beginner and expert skill levels.

In the second calibration session one week prior to the first viewing, I:

- Presented the final Skill Scoring Rubric.
- Practiced scoring with the judges to discuss subtleties in the tool.
- Presented the method of descriptive statistical analysis and clarified that most importantly, the judges need to be consistent with themselves when scoring.
- Dialogued about the variables on the scoring tool, and whether a three-point or five-point Likert scale would be most effective for their evaluation. We decided on five, and practiced scoring several videos of beginning and dancers outside the study.

The training workshop was process-based, and unfolded with emerging themes and lessons based on the participants. However, the outline and overall structure of the workshop was formulated around the criteria present in the evaluation tool, thus aiming to directly link subjective learning experiences to variables for objective evaluation: *Use of Spine, Phrase Material Retention, and Choreographic Intent.*

After the collection of all video clips, I reviewed clips performed by each participant in the control and treatment groups to select their best of three performances

of each phrase from entry and exit filming. I selected best performances based on the Skill Scoring Rubric (See Table 3) finalized in the judging calibration sessions. Each participant was therefore represented by four clips for each viewing: Phrase A entry, Phrase A exit, Phrase B entry, and Phrase B exit.

Table 3 Skill Scoring Rubric Assessment Parameters

Scoring Variables:

Use of Spine:

- Connectedness and integration through movement
- In coordination patterns: neutral, flexion, extension, hyperextension, lateral flexion, rotation, circumduction, undulation, differentiation

Phrase Material Retention:

- Clarity of direction
- Use of space

Choreographic Intent:

- Clarity of dynamics (Time and Energy)
- Execution of choreographic detail (shaping)

How often is the dancer "like the expert?"

1 – 0-20% of the time?	(never)
2 – 21-40% of the time?	(seldom)
3 – 41-60% of the time?	(sometimes)
4 – 61-80% of the time?	(often)
5 – 81-100% of the time?	(almost always)

Judges were coached to tool their thinking to the high end of the percentage scale.

The Judges

The three judges for this research were experts in the fields of dance science, somatics, pedagogy and/or contemporary dance. All judges are, or have been teachers in higher education. I knew all judges prior to this research. They were recruited in

compliance with the Institutional Review Board Human Subjects Approval at the University of Oregon (See Appendix I). Consent forms were collected prior to their participation in this research (See Appendix K).

- Judge A is on faculty at Lane Community College and has served as adjunct faculty at University of Oregon. Judge A holds an MFA in Dance from University of Oregon, a Mat Pilates certification, and is a Guild Certified Feldenkrais® Practitioner.
- Judge B is currently an Associate Professor in the Department of Dance at the University of Oregon. Judge B holds an MFA in Dance from Arizona State University, and has served on faculty at Minnesota State University, and several community colleges. Judge B has a background in competitive gymnastics.
- Judge C is a practicing Doctor of Physical Therapy at a local clinic in Eugene, OR. Judge C holds an MFA in Dance from Arizona State University, an MA in Dance Kinesiology from the University of Utah, and is a Certified Laban Movement Analysis Integrated Movement Studies Practitioner and Pilates Instructor.

Judging Panels

Two different judging panels (viewing 1 and viewing 2) took place three weeks apart. Each session took approximately 2.5 hours. The 52 clips of 13 participants performing Phrase A and Phrase B in the entry process and exit process were coded and randomized. I organized the clips into four videos containing 13 clips each for the judging viewing to allow for breaks every 20-30 minutes when scoring. Between each

clip was 30 seconds of a black screen to allow the judges to score. The expert dancer from the learning video was shown after each break as a reminder of expert level execution of the phrases. Both the viewings, I placed what I perceived the highest scoring clip as Clip 1, to help give the judges a reference point for the remaining clips, a strategy used in competitive gymnastics (Brad Garner, December 11, 2016, personal conversation). The clips were reordered and recoded for a second viewing, three weeks after the first viewing. In analysis of the data, the first viewing and second viewing scores were combined to double the points possible in each participant's total overall score.

Data Analysis

Quantitative Evaluation

After data collection, I used descriptive statistics to calculate and analyze total scores. This enabled analysis of Phrase A and Phrase B for overall group change, individual change by each participant, and change by each scoring variable, as well as overall. With three judges scoring each clip using the Skill Scoring Rubric (Appendix A), each clip had a total possible overall score of 15 points per judge (five points *Use of Spine*, five points *Phrase Material Retention*, five points *Choreographic Intent*), 45 points across three judges. Combining the first and second viewing scores bring each clip's possible score to 90 points. When broken down by scoring variable, each of the three variables had a total possible score of 30 points.

Qualitative Evaluation

Data collected for each participant included video-recorded entry and exit interviews (See Appendix C), and entry and exit questionnaire (See Appendix B). The treatment group kept a journal during each session (Appendix D). The entirety of the workshop was video-recorded enabling referral to specific moments during analysis.

First, the effects of the workshop were analyzed on an individual basis. After the workshop, I created a binder for each participant containing 14 journal entries, an entry and exit questionnaire, and transcription of their video-recorded entry and exit interviews. In analyzing each participant's binder, I noted recurring themes and subthemes, words, and patterns of speech and writing. To complete content analysis on all qualitative data, I used data reduction and interpretation to generate categories of meaning, themes, and patterns across the treatment group (Marshall and Rossman 1995, 114). In developing these themes, I used the participant's language and my interpretation of the data provided.

The mixed methods design of this research enables a detailed look at both group and individual results. Each step in the process of this research was highly detailed and controlled to my best ability. Using my perspective, the perspectives of the judges, the perspectives of participants provides me the ability to follow through in analyzing qualitative, and quantitative sides of this inquiry.

CHAPTER IV

RESULTS

The results of this research are separated into three categories: quantitative data, descriptions and individual reports, and group themes. The quantitative data reports the results of the judging panel's evaluation of participants' performances. The qualitative data consists of individual reports and group themes. Every participant has a description, and the participants in the treatment group have detailed individual reports on their experience. Individual reports and group themes are based on data from questionnaires, interviews, and journals provided by each participant. Finally, I triangulated the observations of the judges, the experiences of the participants, and my experience as the researcher to illuminate the research question (Marshall and Rossman 1995, 144).

Quantitative Data

Table 4 and Table 5 display the judging results of each participant by group. For Phrase A and Phrase B, overall entry and exit scores are shown followed by a score for each variable. The total possible score for Phrase A and Phrase B is 90, and each variable is 30. The difference scores show the change between entry and exit scoring.

Phrase A Results

Figures 1 and 2 display the results of the participants' performance of Phrase A showing additive overall scores upon entry and exit. Figure 1 is the treatment group, and Figure 2 is the control group. Figures 3-8 (see Appendix E for all figures) separate the results by group, showing the results of each scoring variable: *Use of Spine, Phrase*

Material Retention, and *Choreographic Intent.* Note the progression of the treatment group in all three variables in relation to the control group.

Table 4 Treatment Group Scoring Results

Participant Scores		**Phrase A**			**Phrase B**		
Treatment Group		Entry	Exit	Difference	Entry	Exit	Difference
Emma	**Overall**	**71**	**87**	**16**	**71**	**84**	**13**
	Spine	23	30	7	23	27	4
	Retention	25	30	5	26	29	3
	Intent	23	27	4	22	28	6
Colleen	**Overall**	**58**	**74**	**16**	**64**	**67**	**3**
	Spine	18	22	4	16	19	3
	Retention	21	29	8	27	27	0
	Intent	19	23	4	21	21	0
Marie	**Overall**	**48**	**77**	**29**	**68**	**69**	**1**
	Spine	12	21	9	20	21	1
	Retention	21	30	9	26	26	0
	Intent	15	26	11	22	22	0
Lily	**Overall**	**36**	**67**	**31**	**46**	**46**	**0**
	Spine	13	22	9	13	11	-2
	Retention	12	25	13	18	22	4
	Intent	11	20	9	15	13	-2
Kay	**Overall**	**27**	**62**	**35**	**28**	**58**	**30**
	Spine	8	17	9	8	16	8
	Retention	9	24	15	11	25	14
	Intent	10	21	11	9	17	8
Skylar	**Overall**	**19**	**36**	**17**	**20**	**32**	**12**
	Spine	6	10	4	6	10	4
	Retention	6	15	9	6	12	6
	Intent	7	11	4	8	10	2

Table 5 Control Group Scoring Results

Participant Scores		**Phrase A**			**Phrase B**		
Control Group		Entry	Exit	Difference	Entry	Exit	Difference
Alexa	**Overall**	**66**	**54**	**-12**	**60**	**57**	**-3**
	Spine	18	11	-7	11	11	0
	Retention	26	25	-1	29	28	-1
	Intent	22	18	-4	20	18	-2
Joelle	**Overall**	**64**	**80**	**16**	**66**	**79**	**13**
	Spine	17	25	8	20	24	4
	Retention	23	30	7	25	30	5
	Intent	24	25	1	21	25	4
Sala	**Overall**	**43**	**63**	**20**	**60**	**75**	**15**
	Spine	11	19	8	17	24	7
	Retention	18	26	8	25	29	4
	Intent	14	18	4	18	22	4
Riley	**Overall**	**41**	**49**	**8**	**48**	**52**	**4**
	Spine	10	12	2	11	11	0
	Retention	18	21	3	21	22	1
	Intent	13	16	3	16	19	3
Jo	**Overall**	**40**	**48**	**8**	**62**	**42**	**-20**
	Spine	13	10	-3	15	11	-4
	Retention	14	22	8	26	18	-8
	Intent	13	16	3	21	13	-8
Katie	**Overall**	**37**	**44**	**7**	**32**	**53**	**21**
	Spine	11	13	2	9	13	4
	Retention	13	17	4	12	23	11
	Intent	13	14	1	11	17	6
Tiberius	**Overall**	**28**	**40**	**12**	**26**	**35**	**9**
	Spine	9	11	2	8	8	0
	Retention	11	17	6	9	16	7
	Intent	8	12	4	9	11	2

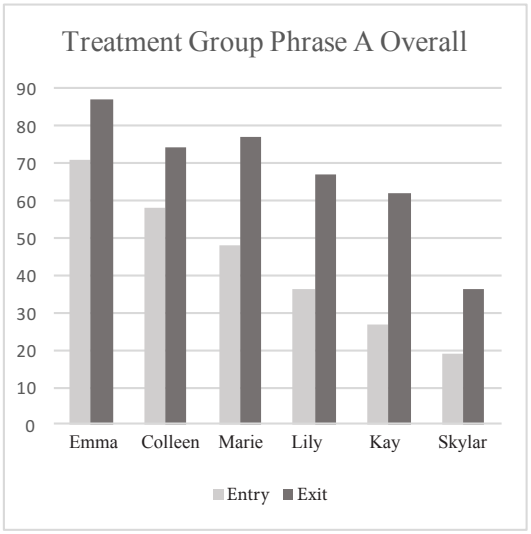

Figure 1 Treatment Group Phrase A Overall Results

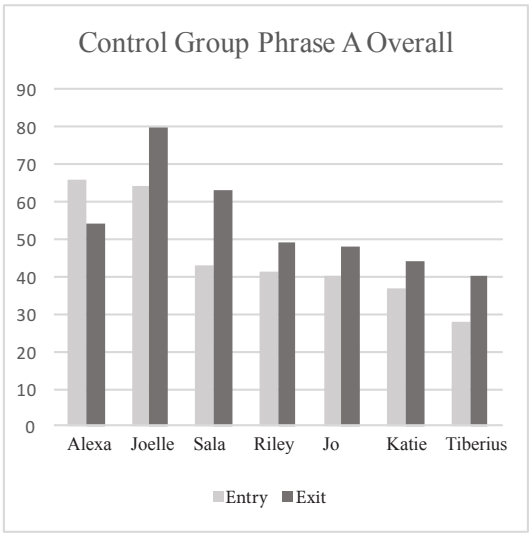

Figure 2 Control Group Phrase A Overall Results

Phrase B Results

Figures 9 and 10 display the results of the participants' performance of Phrase A showing additive overall scores upon entry and exit. Figure 9 is the treatment group, and Figure 10 is the control group. Figures 11-16 (see Appendix E for all figures) show the results of

each scoring variable: *Use of Spine, Phrase Material Retention,* and *Choreographic Intent.* Note the varied levels of progression in the both groups overall, and in all three variables. Note the difference between Phrase A results and Phrase B results.

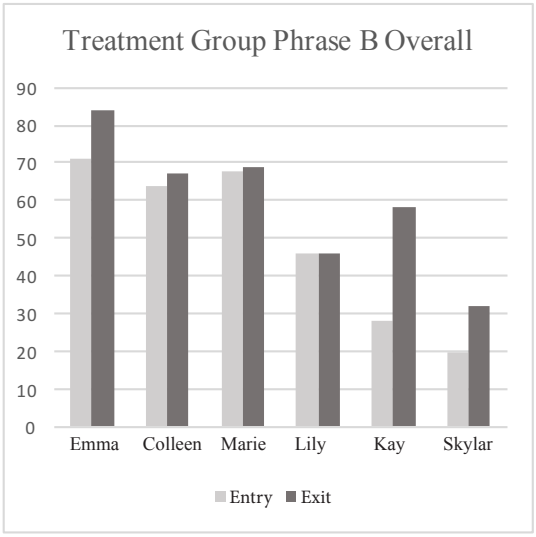

Figure 9 Treatment Group Phrase B Overall Results

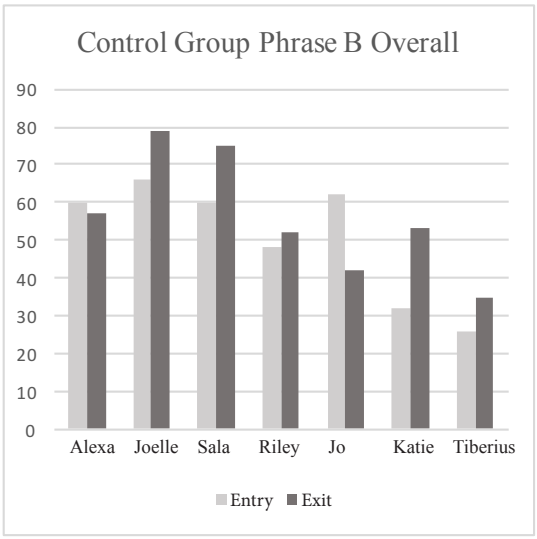

Figure 10 Control Group Phrase B Overall Results

Descriptions and Individual Reports

The participant pool was divided into two groups, the treatment group, and the control group (See Table 1). Entry and exit data from interviews and questionnaires were collected from all participants. Journals were collected from the treatment group during the workshop. Below is a description of each participant. Following the description of each participant in the treatment group is an individual report. Each individual report weaves together data collected in various modes throughout the investigation. My aim is to report their experiences in the workshop through themes apparent across the data and supported by their own sentiments. Each participant varied greatly in the reflective ability, and the depth of qualitative data collected varied across mediums: some participants were more articulate when speaking, and some when writing. This yields differences in each individual report.

Control Group

Alexa

Alexa is a 19 year-old sophomore, non-dance major. She has been dancing in a recreational studio since age 12. Since arriving at University of Oregon, she has taken several intermediate level dance technique courses in modern, jazz and hip-hop. During this study, she was enrolled in an experiential anatomy class offered in the Department of Dance. She spent six hours per week in a dance studio during the study.

Joelle

Joelle is a 20 year-old junior, dance minor. She has been dancing modern in a recreational studio since age seven. Since arriving at University of Oregon, she has taken several technique classes at the intermediate level. During this study, she is taking a somatics course offered through the Department of Dance. At the end of the fall term (when this study took place), Joelle was leveled up to the advanced modern technique class. She spent 14 hours per week in a dance studio during the study.

Sala

Sala is a 19 year-old sophomore, dance major. She has been dancing in a competitive studio since age five. Since arriving at University of Oregon, she has taken several technique classes, beginning ballet from me. She has taken theory courses in the Department of Dance and during this study is taking a somatics class and beginning choreography. She spent 28 hours per week in a dance studio during the study.

Riley

Riley is a 19 year-old junior, dance major. She has been dancing in a recreational studio since age three. Since arriving at University of Oregon, she has taken several technique classes, intermediate modern from me. She has taken theory courses in the Dance Department including Dance Kinesiology, and beginning choreography. She spent 23 hours per week in a dance studio during the study.

Jo

Jo is a 19 year-old sophomore, non-dance major. She has been dancing in a recreational studio since age three but in high school only participated in dance team. Since arriving at University of Oregon, she has taken jazz and hip-hop from me, and a theory course in dance appreciation. She spent two hours per week in a dance studio during the study.

Katie

Katie is a 19 year-old sophomore, non-dance major. She has been dancing in a recreational studio since age three but in high school transitioned to only dance team. Since arriving at University of Oregon, she taken several dance technique courses, most of them from me. She spent two hours per week in a dance studio during the study.

Tiberius

Tiberius is an 18 year-old freshman, non-dance major. She has been dancing on and off in a studio since age five, focusing the last two years on musical theater. This is her first term at University of Oregon. She spent zero hours per week in a dance studio during the study.

Treatment Group

Emma

Emma is a 19 year-old junior, dance major. She has been dancing in a studio her whole life with a primary focus in ballet. Since starting her studies in U of X's Dance

Department, she has taken several technique and theory classes at the intermediate/advanced and advanced levels. She spent 25 hours per week in a dance studio during the study, including advanced technique, beginning composition, rehearsals and the workshop. Prior to her participation in this study, Emma had taken a somatics course.

Emma reported gaining, "technical improvement: knowledge of the body and MY body." Gaining new way of translating what a teacher/choreographer is asking her to do, Emma stated, "now I look at how movement is done, not just what a movement is," and appreciated the integration of "knowledge into body practice." After our first lesson utilizing Andrea Olsen's chapter from *Bodystories* "Three Body Weights and Postural Alignment," (1991), Emma was delighted with the clear imagery she was finding and stated, "before, there were only two, head and pelvis." She also noted how explorations of ligaments and fascia provided her new connections in understanding concepts and the ability to integrate these concepts into her movement. She appreciated finding her bony landmarks and sensing her spinal curves through activities like bridging.

Throughout the workshop, Emma was connecting her experiences in the workshop to her advanced modern technique class. She referred specifically to how the neuroscience lesson made her aware of making connections in all facets of her dancing, including her composition class. She felt significant improvement in her ballet and modern classes, and reported her technique improved in her use of her whole spine, and movement phrasing.

Colleen

Colleen is a 19 year-old sophomore, marine biology major. She has been dancing in a competitive studio her whole life and in the Dance Department has taken intermediate modern and jazz, the latter from me. Her only time in the dance studio during this study was the three hours per week in the training sessions.

From the onset of the training, Colleen used language that reflected strength, placement, and correctness defining technique as "all the different ways you can place your body." Her competitive dance background drove her definition of technique to be concerned with aesthetic skill execution and balletic influence. When referring to her technique, she claimed the workshop helped her improve her "use of space," directly referring to her new-found ability to extend her thoracic spine without "scrunching" her neck.

The collected data shows growth in her knowledge of her spine, and how to effectively use the spine and center in her dancing. She noted initiating from her spine decreased effort in her dancing. Ligaments and fascia were systems she could sense without needing to picture them in her body. She spoke primarily about using her spine in the sagittal plane, and the tactility of bridging helped her sense her thoracic spine. She reported that the workshop changed how she learned the phrases in the exit phase enabling her to connect and flow the movements, and think about the use of her spine. In Phrase B she could actually picture it.

In her exit interview she evolved her definition of technique to "different ways to move your body that are not only aesthetically pleasing, but good for your body as well." She felt her dancing improve throughout the study, particularly in the use of her spine,

but noted how she felt her endurance had decreased because of an overall lack of physical activity over the term.

Marie

Marie is a 19 year-old sophomore, dance major. She has been dancing in a studio her whole life with a primary focus on ballet. Since starting her studies in U of X's Dance Department, she has taken several technique and theory courses including hip-hop from me. She spent 23 hours per week in a dance studio during the study, including intermediate/advanced ballet, intermediate modern, somatics, rehearsals, and the workshop.

Marie sees the art of dance and dance technique as separate, stating that dance technique is the "basics if you take away artistry." She expressed wanting to improve her leg extensions. Marie constantly mentioned her habits, injuries and previous corrections given to her by her teachers. She referred specifically to "holding in my chest" and "tucking my pelvis" as two corrections she constantly received, yet never understood until the workshop. Marie reported that she really appreciated understanding "why it is helpful to be in alignment when dancing, not just imitating movement cues because the teacher asked."

During the training, Marie was enrolled in a somatics course, as well as an intermediate/advanced modern technique course taught by a faculty member who focuses on the application of somatic principles to modern dance. She found having the workshop concurrently allowed for connections across contexts. She stated, "I had to write a paper about how you had us explore all of the Bartenieff Fundamentals[sm] and what we could

change to make it feel different during our experience. And in my other classes we just did the movements, so I think having similar experiences in different contexts made it make more sense."

Marie connected deeply to learning about ligaments, sensing stability as she imagined big rubber bands pulling her back into alignment enabling less muscular effort. She reported that awareness of her spine allowed her to overthink and overwork less. She reported a new understanding that movement can start on the inside, not from only her limbs stating, "now I feel strong, but not rigid." From her perspective, her dancing and understanding of her dancing improved.

Lily

Lily is a 19 year-old sophomore, sociology and cinema studies double major. She has danced in a studio her whole life with a primary focus in tap and jazz. In the Dance Department at University of Oregon, she has taken my beginning ballet and intermediate jazz class in addition to a lecture-based anatomy course. Her only time in the dance studio during this study was the three hours per week in the training sessions.

Lily entered the study thinking about dance technique as placement. She expressed a desire to connect her limbs to her core in movement. Lily referred consistently to her habits and how they may be connected to her lower back pain. Partner feedback helped her discover how to laterally flex from her spine, and sense her previous habit of folding from the hip joint instead of side-bending in her spine.

Lily reported "understanding breath" was her biggest takeaway from the workshop. She sensed change in her use of effort and movement range in direct relation

to her new understanding of breath. She found a relaxation, and a re-defining of effort based spinal initiation. In the exit phase, she reported the workshop was about learning "how to dance." She appreciated the information we learned applied directly to movement stating, "we danced it—I was able to put it in my body. I gained knowledge of my own body, what I can and can't do and how I do things."

Lily reported feeling such profound shifts in her dancing that in the exit phase she re-tooled her definition of technique stating, "all I think about now is the spine and how it moves. It gives me a centralized area to focus on so I can work on everything else." She stated that she improved the most in understanding transitions and moving into low space, and arrived at the exit process expressing that Phrase B would be where she had to apply everything she learned.

Kay

Kay is a 20 year-old sophomore, art history and advertising major, and arts management minor. She has danced ballet and modern since age eleven in recreational studios and at a community college. She has taken several technique courses in the Dance Department at University of Oregon, including my intermediate modern class. Kay spent five hours per week in a dance studio during the study, including intermediate/advanced ballet and the workshop.

Kay claimed she learned more in this workshop about her dancing than any other dance class, as her understanding deepened in "how structure and function interrelate." Upon entry, Kay referred to a "blank and uncertain" spot in her upper thoracic spine, and in the exit phase reported new awareness. Learning about movement potential of the

spine made her “aware of how I wasn’t moving” and helped her to “let go” of compensation patterns. She appreciated the conceptual progression, and putting verbal language to movement throughout the workshop. Kay thought learning about the curves of the spine set up succeeding lessons, and spinal initiation lessen effort in her dancing.

At the beginning of the study, Kay expressed a desire to improve her movement retention abilities. Kay reported how understanding the use of her spine helped her with understanding and retaining use of space and direction changes in the exit process. She made connections from the workshop to her ballet practice, and reported new information “permeating all facets of her life.” She reported improvement in her awareness, technique, and retention related to the repetition of phrases each session, and connecting a body system to concrete movement patterns. She, however, was not confident it would yet be seen by an observer.

Skylar

Skylar is a 19 year-old sophomore, public relations major, dance minor. She has danced in a studio her whole life with a primary focus on jazz, drill and pom. Since beginning her studies in the Dance Department at University of Oregon, she has taken several technique courses including intermediate modern from me. She spent five hours per week in a dance studio during the study, including intermediate ballet and the workshop.

Skylar entered the study with a hunger to understand what she “should feel like” when she dances modern. She expressed desire to learn about how she learns. In her initial definition of technique she referred to Ballet as the “root of it,” but by the end of

the workshop her thinking evolved into "positioning and alignment," regardless of the style.

Skylar continually expressed a desire to relax, noticing her movement habits outside of the studio may contribute to pain in her spine which impacts her dancing. She had several moments of discovery regarding mobility, especially in her thoracic spine, referring to her spine "getting more bendy." Skylar made connections in her dancing after learning about ligaments. She felt a lessening of effort stating, "they help us bounce back to neutral. There is an action and reaction, which lessens effort." The idea of returning to neutral recurred in Skylar's writing throughout the workshop apparent in her comment, "now I have been thinking about getting back to that place of good posture after doing all that other stuff when you are dancing."

In the end, she considered breath a tool that helped her with movement retention. She "knew how to initiate and breathe through different movements" when learning phrases in the exit phase because of new language and the ability to lessen effort in movement execution. Skylar started to think about spine as central to movement, instead of just imagining her "limbs and silhouette." When asked if her technique had improved, Skylar reported gaining confidence throughout the workshop, and an improved understanding of spinal mobility.

Group Themes

After collecting and organizing journals, questionnaires, interviews, and footage from the workshop, I analyzed the data collected from each participant in the control and treatment groups through data reduction and interpretation (Marshall 1995, 113). I

extracted themes and sub-themes based on three modes of data collection: questionnaires and interviews from all participants, and journals from the treatment group. I referred to the workshop video recordings for further elaboration when needed. Through this process, ten themes emerged in relation to the participants' experiences:

- Self-Perceived Improvement
- Learning Processes
- Effective Movement Content
- Body Systems
- Defining Somatic Principles
- Peak Days
- Self-Discovery
- Learning for Performance
- (re)Defining Dance Technique
- Overall Gains

These themes are covered in depth in the following pages.

Self- Perceived Improvement

This section reports the results of each participant's answers to four questions about their self-perceived improvement. Table 6 reports the results of the control group, and Table 7 reports the results of the treatment group. While the prompts may appear redundant, in content analysis, they all emerged as important.

Table 6 Control Group on Self- Perceived Skill Improvement

Entry Interview Is there an aspect of your dance technique you are interested in improving?	**Exit Interview** Do you recall what you were interested in improving this term? Do you think this happened?	**Exit Interview** Is there a certain part of your dance technique you think improved or evolved this term?	**Exit Questionnaire** Has your dancing improved this term? What do you attribute this to?
Alexa: Trying to make sure my whole body is involved	My back. Yes, with awareness and knowing how to execute things.	Awareness, because my back was getting better and I wanted to know why this is happening.	I don't think my dancing has, but my movement awareness has.
Jo: Turning	Turns. No.	No.	No, I wasn't taking class.
Joelle: Tuning into my anatomy, efficiency	Fluidity through the whole body, connecting upper and lower body. Yes.	Yes, finding power and thrust in movement without overworking to find stability.	Yes, through my education in somatics and exploration in modern class.
Katie: Holding leg up and waving arms around, turning.	No, No.	I am thinking about movement differently, and I learned how to moon walk!	My thoughts about style have, I learned some hip-hop technique/skills.
Riley: Leg height, emotional presence	No, No.	Stability, from an image in modern of energy in the pelvis going up and down.	Yes, reading a book in somatics based modern class and practicing the concepts helped.
Sala: Grasping foreign concepts quicker	No, No.	The way I carry myself and spread my feet on the floor, and my breath. I spent a lot of time in the studio.	Yes, hours in the studio and my somatics class.
Tiberius: Flexibility and controlling turns/leaps	Flexibility, No.	No.	No.

Table 7 Treatment Group on Self- Perceived Skill Improvement

Entry Interview Is there an aspect of your dance technique you are interested in improving?	**Exit Interview** Do you recall what you were interested in improving this term? Do you think this happened?	**Exit Interview** Is there a certain part of your dance technique you think improved or evolved this term? (Treatment: did the workshop effect this?)	**Exit Questionnaire** Has your dancing improved this term? What do you attribute this to?
Emma: Clarity and ease	No, No.	Phrasing, and use of my whole spine, rather than parts. Yes.	Yes, the integration of knowledge into "body practice."
Colleen: Strength to and from floor and arms	Breathing? Endurance? In some cases….	Use of space, internal and external. Yes.	Yes, my dancing is more controlled, and I am aware of external space.
Marie: Better leg extensions	No, No	Alignment of my spine has changed, more release in the upper and ribs and lumbar. Yes, especially in conjunction with my somatics class.	Yes, immensely. Understanding my anatomy and my power without forcing it.
Lily: Posture and core to limb connection	Flexibility and balance and shifting weight. Yes. Not flexibility, but shifting weight and centering.	Awareness of other parts of my back than my lower back problems. Using my breath. Yes.	Yes, I have more control in transitions and getting to/from the floor.
Kay: Retention, not holding tension, appearing effortless, transitions	Retention, Yes!	I made minor breakthroughs about parts of me where I didn't know what was happening (lower neck, upper thoracic). Yes.	Yes, careful attention and reflection about the spine in relation to the phrases we repeat each week.
Skylar: The feeling of doing movement	No, No.	My spine got more bendy, now thinking of alignment as dynamic. Yes.	My confidence in my ability improved as I now have more specific language and images of what I should be doing.
Ann: Not being straight and exact	No, the workshop was focused on our learning.	Fluidity of movement. I really "let it go," looser than I have ever been. I also realized I don't need to look where I am going.	Yes, my new knowledge of the spine.

Learning Processes

Through identifying themes in answers to the journal prompts, questionnaires, and interviews, outcomes based on learning processes emerged. Based on participants' answers on the questionnaires, their overall knowledge of anatomy, kinesiology, and neuroscience grew during they study. Several participants expressed how the verbal language and images helped them learn the phrases in the exit phase because they could see a movement vocabulary now that they had not seen upon entry.

When analyzing all qualitative data, it became clear that repetition of movement over time was helpful in facilitating their understanding of movement concepts, patterns, and their individual bodies. Feedback from observers was helpful, and in fact the days we used partners the most (3.2, 6.1) led to some of the most successful days based on their journal reflections. It allowed them one on one feedback, and created a conversational and comfortable environment. Participants appreciated visuals, in depth explanations paired with sensory experiences (whether structured activities, scans, or improvisations), and readings because they helped to clarify and create a common verbal language. In creating this language, it was clear that the order in which concepts are presented is of utmost importance to learning. In the exit interviews, they expressed with excitement how, in both improvisation and choreographed phrases, putting new information into movement right away was a new way of learning. Through their journals, participants noted the effectiveness of layering new ideas and concepts onto movement phrases they already knew.

Effective Movement Content

Through the process of data reduction and interpretation (Marshall 1995, 115) in answers to the questionnaires, journal prompts and interviews, themes emerged about content covered in the workshop. We began by using non-anatomical language in our explorations with Andrea Olsen's "Three Body Weights and Postural Alignment" (1991). We then progressed through concepts engaging bones, joints, ligaments, coordination, actions, muscles, nervous system, fascia, integration, and finally concepts embedded in the *Choreographic Intent* variable of the scoring rubric including space, and energy. Some participants, like Ann, found systems beyond bones and joints, "like muscles and other stuff," challenging to understand. Kay believed that starting with the bones and curves, "set us up for everything else." Colleen ended up using the language of space and effort in her exit interview when speaking about her internal experiences. When asked how her technique improved, she answered, "use of space," and then continued with an in-depth explanation about discovering new movements in her spine and upper back gave her a whole new movement vocabulary in her dancing.

Spinal Curves

Participants found learning about and sensing the curves of their spine new and exciting. Many reported the knowledge of their spinal curves affecting other facets of their life, like Kay. "I would go home and talk to my roommates about the idea of sitting up "straight," and notice that this knowledge has permeated other parts of my life." Our exploration of spinal curves was set up first with images, sensory, and movement experiences using imagery from the chapter "Three Body Weights and Postural

Alignment" from Andrea Olsen's book, *Bodystories* (1991, 35). In this chapter, Olsen (1991) describes the head, ribs, and pelvis as three weights that connect the spine. Through sensory explorations and improvisation, we explored each weight in ourselves and engaged in dialogue about how we experience the weights. This image brought many participants clarity about why there are curves in the spine. We then looked at images of bones, a three-dimensional skeletal model in support of our explorations. Spinal curves, and body weights recurred in language throughout the workshop.

Creating a Verbal Language

Using the spine as a lens to view movement phrases we practiced gave the dancers a consistent verbal language to use when thinking, conversing or writing. Many participants carried imagery throughout the workshop from different days, such as "three body weights," and "spinal curves." All participants referred to the movement vocabulary (flexion, extension, hyperextension, rotation, lateral flexion, articulation, undulation, counterbalance) in their journals.

Upper Back

Most participants expressed that their thoracic spine or "upper back" was mysterious and challenging to understand in movement. Activities involving tactile feedback with partners assisted participants in understanding movement potential. Experiences with breath and supine positions also helped. Emma recalled being prone and allowing her ribs to fan open in an extension. We spent time chatting about moving

the thoracic spine in the plié phrase, as it was full of spinal articulations in all planes. At the end of the workshop, many referred to understanding their upper back in a new way.

Breath

While no one day was devoted to learning about breath, it was referred to each day in our movement sessions as a somatic principle (Brodie and Lobel 2011). By the end of the workshop, participants sensed its' importance in movement, and its effects on their dancing, especially through the thoracic spine. Day 8.1 we used breath as an improvisatory tool, which allowed for an integration into full-out movement.

Sagittal Plane

Throughout the workshop, participants referred predominantly to spinal actions in the sagittal plane (flexion and extension), as they were most comfortable and familiar. Several days we had a supine warm-up integrating movements from Feldenkrais®, Pilates, and Bartenieff Fundamentals℠. Upon reflection, most participants referred to a forward pelvic shift in Bartenieff Fundamentals℠ as the most effective way to feel their spinal curves, three body weights, and spinal articulation. It was only one of several different actions, yet stood out consistently in their journals.

Dance Phrase

One dance phrase, introduced day 3.1, was referred to as the "falling backwards phrase." I created this phrase based on the ideas of translating the pelvis and spine through space, rotating the spine, shifting weight, being off-balance, and returning to

neutral from a flexed position. We repeated it five different days, including the last day. It was cued from the spine, and had a mix of weight shifts with a neutral spine, and weight shifts with an accompanying spinal action. Several participants referred to experiencing change in their dancing and embodying new ideas through the execution of this phrase. Colleen suggested that this phrase helped her to understand the mobility of her thoracic spine. Ann recalled that she could sense what her spine was doing in the full-out dancing for the first time.

Finding Center

Early on in the workshop, day 2.2 was themed "finding center." Thus far, the content we covered revolved around bones and joints. I read from Irene Dowd's "Finding Your Center" (Dowd 1981) and followed her movement progression. We also used Karen Clippinger's bony landmarks for standing alignment from *Dance Anatomy and Kinesiology* (2016) as reference. Most participants referred to this day as helpful in integrating ideas about the bones, joints, ligaments and movements, and discovering their own individual movement habits.

Body Systems

In Table 8 is an overall view of the order of body systems explored in the workshop in direct relation to the spine. In reviewing all journals, questionnaires and interviews, I deduced an overall attitude from the group around learning and sensing each system in movement.

Table 8 Attitudes about Body Systems of the Spine

Bones and Joints	Easy to grasp and understand. Familiar. Tactile on self and others. Set up upcoming systems.
Ligaments	Challenging to imagine, but not to sense. Provided clarity in movement and new movement quality.
Muscles	An exploration in effort. Sensate. Images helped to make connections. Not all participants felt successful integrating.
Nervous system	Connected mind to movement. Provided "information" about how bones, muscles and mind interrelate. Hard to sense.
Fascia	Challenging to sense in stillness, but images facilitated connection and integration of all previous systems in movement experiences. Appealed most to more advanced dancers.

Defining Somatic Principles

Throughout the workshop, I used four somatic principles of breath, sensing, connectivity and initiation (Brodie and Lobel 2011) to inform content and approaches in the workshop. These principles were embedded in the workshop, but not explicitly written into my lesson plans. Tables 9-12 paraphrase definitions of each principle provided by all participants in the entry and exit questionnaires. I note evolution in the answers given by the treatment group, particularly in their use of words.

Peak Days

When analyzing participant journals, several sessions stood out based on their reflections, connections to previous lessons, personal experiences, or content that recurred throughout the workshop. Additionally, participants were asked what lessons or concepts were most memorable in the exit interviews.

Overall day 3.2 was referred to by five participants and 6.2 was referred to by 6 participants as memorable or successful in journals. Both days were full of reviewing

Table 9 Fundamental Somatic Principles: Breath

In movement, what does the term Breath mean to you?	
Control Group Before	Control Group After
control, inhalation/exhalation, vital to dance, tool to emphasize movement, helps move and survive, movements can breathe, flow, source of energy	use it to keep going, inhalation/exhalation, the channeling of energy to every space in the body, tool to emphasize movement, support, fluidity/openness, oxygenation, source of strength and dynamic range, beginning and end of a movement
Treatment Group Before	Treatment Group After
Staying alive, being with movements, breathing to specific parts of body/movement, rhythmic biological function, guide/inform movement, a pause/moment in a phrase, finding lift/emphasis, useful in balancing, necessity	Breathing in and out of movements, influences spine/other body parts/movement qualities, rhythmic, supportive, facilitates movement, it is EVERYTHING, crucial, grounding, strength, ease, connection, expansion and contraction of ribs, moves you through the phrase, creates flow

Table 10 Fundamental Somatic Principles: Sensing

In movement, what does the term Sensing mean to you?	
Control Group Before	Control Group After
Awareness, interpretation, expression, connection, making use of sensory organs, shifting focus from mind to body, knowing the next movement because of a previous connection, spatial/musical/movement/ mind/body awareness, weight, touch, knowing where dancers are around you	Awareness of surroundings and self, using sensory organs to experience, shift out of mental experiences and into body, hearing music, feeling ground, how movement makes you feel, spatial/musical awareness, feeling body alignment and "correctness," observing my breath, weight, and focus
Treatment Group Before	Treatment Group After
Feeling (music/yourself/others), experiencing movement/surroundings and what is happening in the body, being present, paying attention to how body/movement is evolving and how it looks, awareness of upcoming movement/music, feeling how a movement is/should be accomplished, sensing how the parts of your body move together/in space	Feeling how your body feels head to toe, feeling how your body moves/feels when it moves, feeling (with my body) movement in relation to the space around/within me, awareness of self in relation to space, sensing curvature of spine and if one is hyperextended or flexed, energy, knowing what is coming next

Table 11 Fundamental Somatic Principles: Connectivity

In movement, what does the term Connectivity mean to you?	
Control Group Before	Control Group After
Be one with surrounding people/objects, flow, fluidity, transitions, the joining of two movements, movements connected to space/floor	Working with sensing, essential mind/body connection, fluidity, transitions, how movements are connected, connection to and with ground, head to tail relationship, awareness of space, fluidity, flow, connecting to the music
Treatment Group Before	Treatment Group After
Connecting movements, relationship of the entire body (through core, head-tail, etc.), flow of dance from one movement to another, finding connection between movement/music/other dancers/ audience/space, how you perform with others, connection of body parts with movements	Bone and muscle, makes movement flow, through the whole body, not leaving any body parts out, through fascia, momentum, attending to transitions, spine is connected to everything/everything is connected to spine, flow, connecting knowledge of my body's make-up and the movement

Table 12 Fundamental Somatic Principles: Initiation

In movement, what does the term Initiation mean to you?	
Control Group Before	Control Group After
Awareness of where movement comes from, commitment, the sources (body/idea), center of energy, where momentum begins, the beginning of something	Where movement comes from (physically/mentally/spatially), how movement starts, source of energy that channels movement to another place, the beginning of a movement to create sequencing
Treatment Group Before	Treatment Group After
The beginning of a dance, what body part or thought (internal/external) starts the movement, how the point carries to other parts of your body, where movement starts (physical/emotional), how you prepare for a motion, creates flow, through connection	Starting from a single point, where a movement starts, what we sense first or most prominently in order to move, initiating from spine, limbs, etc, starting, energy, how the movement will be done

movement content, images, and language from the previous few sessions, and applying it to full-out dancing. These sessions also both contained in-depth group discussions, allowing for connections to be made with and across the group.

On day 3.2 (coordination), participants worked with partners for the entire duration of the workshop. Because there was an odd number, I was partnered with Lily. It involved sensory experiences such as the "floating head," improvisation, and movement phrases. Each movement experience performed with a partner as observer, and then repeated after partner feedback. This provoked rich conversation with the group, one where we used our partner's support to dissect the action of thoracic and cervical hyperextension while standing. Many participants stated that understanding the structure and function of their thoracic spine was challenging, and that this experience with partners helped. The lesson prior (3.1) was about ligaments, which ended up being a system new to many of the participants, but allowed for a connectivity, buoyancy, and trust in their movement. Marie created an image of rubber bands, always ready to bring her back to neutral.

I recall as sense of community when we left the space. I had participated in the entire duration of this session. Pedagogically, me being an "equal" part of the group was fun, and challenging. It allowed me to have an accurate sense of time within the activities, and facilitate meaningful conversations from the inside. Additionally, the concluding journal prompt was completely open ended in comparison to previous prompts: "Today, please just write about your experience in our movement session. If you need a starting point, here are some things to think about: Breath, Sensing, Connectivity, Initiation." Reflections were rich and thorough, showing progression in

their ability to reflect on their own movement experiences since the beginning of the workshop.

Day 6.2 we revisited the images from *Anatomy Trains* (Myers 2014). Each dancer was asked to choose one or two images to bring into their movement practice. I guided them through the Bartenieff Basic 6, using the movement as a framework for exploring concepts from our sessions thus far. We performed our version of the X series (involving level changes), the plié combination (involving weight shifts, spinal coordination patterns and direction changes), the weight shift series (*en croix* undercurves, translations and overcurves accompanied with spinal action), and an improvisation cued through fascia. At this point in the workshop, we had introduced all the systems to be covered, and danced all the phrases several times. I gave the participants permission to explore what they had learned as they executed familiar movement patterns and concepts. At the end, I taught the complicated culminating phrase of the workshop (the six-step phrase) and I could tell by their demeanors, and in our concluding conversations that they left feeling challenged, yet invigorated as they could see how their new knowledge was beginning to seep into more rigorous contexts.

Beginning in 3.1, I tried intermittently dividing time for journal reflections into two different sessions within the 90 minutes. We would pause during the workshop and immediately reflect on our experiences. We then continued the workshop, and would return and reflect more at the end. I found this successful for several reasons, one being the interruption of the predictable sequence of the workshop. Day 6.2 was a split journal day during a technique class where the depth of their reflections stood out to me. One entry that stands out was from Lily who stated at the end, "I experience my spine as a

vessel to get me somewhere rather than something I need to put all my energy and focus into controlling. I'm finding spinal movement integrated into the rest of my movements."

Other peak days noted by participants were:

- 3.1, (4 participants noted) the first day of split journals, and the introduction of ligaments.
- 5.1, (3 participants noted) split journals, muscles, and a mixture of movement, reading, visual images and two improvisations. 4.2, the day prior, we had given verbal language to all actions of the spine. While only one person immediately referenced this day as important, it set up our language for 5.1.
- 7.1, (3 participants noted) technique class starting and ending with a body scan. Each participant also reviewed their journals and identified themes and images to help them through technique class. We danced six familiar different phrases, and one improvisation.
- 8.2, the final class that integrated the language of the *Choreographic Intent* section with their anatomical experiences in a full length class. Closing reflections for of all the participants were thorough.

While the first and second weeks may not have stood out to me in their journals, I discovered the content covered recurred throughout the entirety of the study, and resurfaced in many of the exit interviews. This is the time when they were learning to reflect, how to put their sensory and dancing experiences into words. The image of "three body weights" and the curves of the spine, according to Kay, "set up everything."

Self-discovery

In reviewing all data, a set of recurring themes emerged based on participants' self-discovery. Some themes are based on content, some based on their experiences.

- Participants felt their dancing change, but some were not sure if it would be seen by observers yet.
- Participants consistently referred to pain and reference to past injury in relation to discovering movement tendencies.
- Participants acknowledged and discovered movement habits.
- Participants spoke and wrote about sensing how their structure and function interrelate in movement and in stillness.
- Participants discovered the value of relaxing. They became curious about finding out how and what to relax.
- Participants experienced a re-defining of effort in their dancing suggesting that initiating movement from the spine lessened effort significantly.

Learning for Performance

After performing Phrase A and Phrase B in the exit process, the participants filled out a questionnaire. The final question was, "What was it like to learn the phrases again? Explain." While all participants had not been exposed to Phrase A or Phrase B in nine weeks, the treatment group had been exposed to the movement concepts and motor patterns present in the phrases. How did practicing motor patterns present in the phrases affect the experience of the treatment group when relearning phrases from a video? Did

either group remember the phrases? Did their other dancing experiences outside of the workshop affect their learning? In the following section, I include each participants' sentiments about their experiences relearning the phrases beginning with the control group, followed by the treatment group.

Control Group

Alexa reported that it was harder the second time because the movements were still in the back of her mind, and she wanted to recall them more quickly than her brain would allow her. She didn't want to spend too much time re-learning what she once knew.

Joelle reported it was much easier in the exit phase, amazed at how much she remembered. She stated that rather than overthinking while she learned, she "let her body find it again." She said that taking technique class for the whole term gave her a lot more experience to bring to this process, and because she already kind of knew it, she got to put "frosting on the cake."

Sala reported it was much easier to learn both phrases in the exit phase. She thinks this is because they were familiar, and that she has found a more efficient way to integrate movement into her body this term. This allowed her to focus more on the music and timing than upon entry.

Riley reported upon watching the phrases in the exit phase, she immediately noticed all sorts of details she never noticed the first time. She was attending to quality of the movement instead of basic shaping- it seemed slower and deeper than she remembered. It was easier to learn the sequence in exit, thus allowed her time to focus on

dynamics and qualities. She also felt it was less strenuous, and more enjoyable. She recognized movements from her modern class and was able to incorporate her spine and whole body this time.

Jo reported it was easier to learn the phrases the second time because some of the movements stayed with her. She claims that retaining choreography is one of her practiced skills, and because she knew the movements, she could pay more attention to detail, timing, and style.

Katie reported that it was much easier to learn the phrases in the exit phase because she was familiar with the type of movement and the music, which allowed her to focus on musicality. She was also less nervous, so she could correct herself and look for nuances rather than just the overall picture.

Tiberius reported it was easier in the exit phase, and that the phrases were familiar, which allowed her to notice more about the detail of the movement.

Treatment Group

Emma reported that learning the phrases was easier the second time. It felt less strenuous and more effortless. She preferred Phrase B in the exit phase, which surprised her. When learning, she looked for different movements of the spine, weight shifts, and how she could use her breath to support movements.

Colleen reported that during entry Phrase A was easier to learn than Phrase B. In the exit phase, Phrase B was easier to learn than Phrase A. She could connect movements and make them flow, while picturing her spine in Phrase B, and in Phrase A she was

putting more effort into thinking about her spine. “The workshop made a huge difference in how I learned the phrases again.”

Marie reported recognizing movements from the workshop, and realized they had become easier for her to accomplish. This allowed her to focus on facings and direction changes when watching and working out the phrases.

Lily reported when watching Phrase A during exit, she recognized concepts and movements from the workshop which gave her confidence. She felt like Phrase B was where she got to apply everything from the workshop. She felt prepared, “I know I have to do all of the movements with a focus on the spine.”

Kay reported that she was aware of more mobility and control of her spine which aided movements and spatial direction changes. Practicing movements individually in the workshop helped, as she thought of it as re-ordering a vocabulary she had in her body. She still felt nervous, but less lost.

Skylar reported it was easier to learn the phrases in the exit phase because she knew pieces of the phrases and had to put them together. She also knew how to initiate and breathe differently through movements because of the new language and vocabulary from the workshop.

Ann did not complete the exit process.

(re)Defining Dance Technique

One of the first questions included in the entry and exit interviews was, “When you hear the phrase dance technique, what comes to mind?” Upon entry, most participants’ answers reflected the image of an external aesthetic or form. Several

answers included ballet as the foundation of technique and placement. There were themes of goal-orientation and structure. After the workshop, answers evolved. Some participants from the training group like Lily and Skylar suggested that technique now is centered around the use of the spine. Several others, like Kay and Emma, suggested that technique is "how" you accomplish movement, and transitions between movements. A theme of individuality emerged for Colleen in her evolved view of technique as, "different ways to move your body that are not only aesthetically pleasing but good for your body as well."

Considering the journal entries, I saw a major shift in verbal language about their dancing throughout the workshop. Participants began to honor themselves, and sought information on their (my) body, spine, movement. Through acknowledging their experiences, they were empowered to take ownership of their own technique, and be curious about their individual idiosyncrasies and potential. These gains in internal authority were referred to in both sensory experiences and full-out dancing. I experienced their definitions of technique become fluid and complex, as opposed to structured and formal.

Table 13 Control Group on (re)Defining Dance Technique and Table 14 Treatment Group on (re)Defining Dance Technique are transcriptions of answers given by participants in the control group in entry and exit interviews when asked, "When you hear the phrase dance technique, what comes to mind?"

Table 13 Control Group on (re)Defining Dance Technique

Entry	Exit
Alexa:. My crazy ballet teacher, and seeing people at competitions that score really high, but you can see that they don't have a lot of technique. Proper placement, proper movement to prevent injury, and being aware of the right way to go about things in regards to your alignment, injury prevention and looking good.	Alexa: In regards to specific genres it is very different. Having the proper knowledge and skill set and awareness to execute the movements for each genre correctly and safely. So knowing that in Ballet you want turned out legs or different core work, whereas in Jazz in might be different.
Jo: The structure of dance and not the expression part, but the foundation and the level that you are able to execute the moves, different than performing.	Jo: The foundation of your skills. What you can do, and what you were trained to do. After you learn technique you can put your own style and expression to it but you need the foundation first.
Joelle: A lot of structure. Technique is something that somebody has already developed as a way of doing things that they believe is most efficient. Some sort of system. I think of classic ballet and modern, but what we are doing now, Body Mind Centering in modern is also its own technique, so, a system of doing things.	Joelle: A system of facilitating movement. People have their systems of going about things. There are more structured techniques and loose techniques. A system or way of doing things.
Katie: Dance Team comes to mind, as it was the focus. The skills like battements and turns and jumps, and stuff that is impressive and less about the musicality. It was about practicing to match technique with other people. I have evolved into less of a mindset of always getting technique right and exploring musicality in college because I never had the opportunity to do that before. People look at it completely differently.	Katie: Now, it is more defined by what the style of dance is. Before I was thinking that it was jumps and turns and fun things, but now you can have different techniques for different styles of hip-hop like gliding and sliding with a technique of its own. A characteristic of a movement that defines the style that you are doing. That evolved since taking your hip hop 2.
Riley: Ballet and very turned out feet. The movement of your body and how that is relating emotionally and spatially.	Riley: Body awareness and inner connectedness with outer connectedness, and the generic technique idea.
Sala: Really hard. It is a working effort that never ends for me. There is always room for improvement. Anything that strengthens me, and movements I become more confident in is an improvement on my technique.	Sala: Stress, currently, I wish it was something else. Hard work, but not necessarily bad.
Tiberius: Pointed Toes. Yep, that is about it.	Tiberius: Pointed toes and turned out from the hips.

Table 14 Treatment Group on (re)Defining Dance Technique

Entry	Exit
Emma: That's hard. Precision and clarity. Moving with ease. That is what I am working on, so maybe that is why I think that.	Emma: Everything that underlies everything. I think, just how do you connect point A to B to C in movement. How do you connect everything. Phrasing, and the in between parts.
Colleen: I definitely think of Ballet, was taught that it was the foundation of everything before you can even get to hip-hop or contemporary or jazz. You need to have the techniques of turn out and placement in Ballet to be able to place your body somewhere else. It is all the different ways you can place your body.	Colleen: Ballet is the instant thing. I was always told that it was the foundation for all other dances. Now, I think of body placement, different ways to move your body that are not only aesthetically pleasing, but good for your body as well.
Marie: Training and being in a class working on placement. Technique to me is not the art, the art is put on top of what you know. You can have technique without performance.	Marie: The basics if you took away artistry. What you have to build off of. There are different levels of technique, plié is a plié. You can do it in so many different ways, and then you put performance on top of it.
Lily: I think of all the technical things like pointing your foot and placing your arms, head and spine.	Lily: Now, all I am thinking about is the spine and how to use it. In technique, the spine gives a centralized area of focus. Now that I have an area to focus on, I can think about everything else.
Kay: Cleaning up your movement in a way where it is recognizable to someone else as good, or a specific thing. I think of Ballet technique as different than Modern technique. The names for steps are different, but I think of Ballet technique as more stringent (although my views on that have shifted since I have been in college. It is more individual here in recognizing what your body can do and acknowledging the limits of your musculature, rather needing to look like everyone else). In modern technique, people can have individual goals. Instead of the steps you are learning, I would define technique, how you are doing them.	Kay: How you are executing a movement or doing movement that is intentional, rather than just walking or pedestrian things. Ballet still pops up. But technique is how you are executing movements or putting thought into them to get a certain outcome.
Skylar: Ballet right off the bat. That is where most people have their basis. Everyone has some ballet training who does dance… so it's the root.	Skylar: It has evolved this term a lot. Before, I thought of it as ballet, but that is changing. There is more fluidity. Now I think about the spine and if it is supposed to be rotating, or fluid, or straight up. Positioning, and alignment.
Ann: Strong ballet technique. Straight and feet and arms. Structured.	Ann: The way you move, and how you do the moves. I used to think of ballet, but technique is more teacher oriented. There are dance genres, but they vary between teachers. The way that each teacher puts them together and into phrases is different, so there is a technique of being able to morph yourself into each class.

Overall Gains

All participants were asked in the exit interview (Appendix C), "Can you name a few things you gained from this experience?" Most of the participants in the control group gave answers that spoke to their learning, while the treatment group spoke about their awareness, dance technique and experience in the workshop.

Control Group

Alexa reported that the entry and exit processes taught her how she learns best through figuring out the phrases. Joelle felt this process allowed her self-evaluation. Sala agreed with Joelle in that they both felt the phrases differently in the exit phase, as they were able to pick things up faster and more efficiently. Joelle attributed this to her Dance Somatics class this term, Sala was in the class as well. Jo and Riley suggested the value of having to learn a dance and perform it right away. Tiberius reported the experience as "fun" and was happy to be in a dance studio.

Treatment Group

Emma said she gained technical improvement emphasizing gains of overall knowledge of the body and "my body." She reported being more aware of how she can help herself move differently when accomplishing movement in class. She stated that now when learning movement, if she doesn't understand what the teacher is saying, she can see them dance and translate it into her body.

Colleen reported increased knowledge of how she can use her spine. Marie found strength and ease coming from her spine outward. In the past, she defined strength as

"clenching muscles." She reported that finding the strength within has made her think moving her limbs less of an effort and more an energy.

Lily eluded to significant gains from this experience, particularly knowledge about her own body. She stated, "I learned a lot about what I can and can't do and how I can do things." Kay reported her biggest gain is knowledge, and that she is just now realizing the impact stating, "movement of the spine made me aware of how I wasn't moving." She experienced a paradigm shift between being aware of her spine and how to initiate from it. Kay was not sure change happened yet in her dancing, but is certain it will if she continues to attend to it. Skylar also had discoveries with her alignment, and "getting back to the place of good posture after you do all that other stuff when you are dancing."

While Ann was unable to finish the workshop, she stated in her exit interview, "Dance isn't just dancing." Understanding basic body mechanics in dance was a new concept to her. "Thinking about the insides is new, I have always been told to do things, and not thought so much about how it is your body moving. I could picture my insides when I was moving, and I have never been able to do that before."

Conclusion

The mixed methods design of this study provided breadth and depth in data collection. The quantitative data offers judging data by group, and by participant. The group themes allow for a comprehensive view into how a somatic approach to anatomy, kinesiology, and neuroscience impacted their experience. Viewing each participant's scores in relationship to their description and individual report shows specifically how their experience may have affected their performance.

CHAPTER V

DISCUSSION

This vast scope of this study reveals emerging themes and content within dance science, somatics, and contemporary dance through learning processes. This study asks whether a somatic approach to teaching and learning anatomy, kinesiology, and neuroscience affects contemporary dance skills from the subjective experience of the dancer, and/or the objective observer. A mixed methods approach provided me the ability to gather qualitative data from the participants, and quantitative data from judges. The participants were able to critically reflect on their dancing skills in the entry process, throughout the workshop, and upon exit. The judges were given three variables, *Use of Spine, Phrase Material Retention, and Choreographic Intent,* to measure a performance on a Likert scale of 1-5.

Quantitative data collection required a distilling of complex components of contemporary dance skills into discrete variables for use in an assessment tool. Often the desire of training is to improve dance technique, a goal-orientation. The eclectic nature of contemporary dance presents a challenge in identifying three variables, therefore I shaped the phrase material and training workshop around the use of the spine.

Through the process of data reduction and interpretation, I discovered the depth of participants' reflection was dependent on the means of collection (verbal or written), and not consistent across participants. Of all the qualitative data collected in this study, the daily journals from the treatment group, including both directed and semi-directed prompts, provided the richest source of reflective data. Some participants were better critical reflectors than others, thus provided more thorough written responses. Others

participated in conversations and were fully engaged in the workshop, but didn't reveal their experiences until interviews and questionnaires during the exit process. I could also see some participants understanding concepts in movement, but unable to translate their experiences into words. Deriving themes and sub-themes to focus on in the results of this research was challenging, yet the various means of data collection including journals, questionnaires and interviews enabled me to represent each participant's voice, even if not seen through quotations throughout the study.

Anatomy in Action

The inclusion of dance science and somatics in dance curricula is common across the field of dance (Geber and Wilson 2010). Often, even in experiential anatomy courses, the information given through lectures, images and textbooks is separated from the application to full-out dancing in a certain style or aesthetic, and instead applied to pedestrian movements such as walking, running, squatting, and individual movements such as pliés, tendus and "pelvic forward shifts" (Bartenieff 1980, 238). Sensory experiences are themselves experiential, but in a dance setting this study found that employing sensori-motor information in phrase material, and with a specific choreographic intent, can assist a dancer in making connections in their dancing facilitating a transfer of learning.

Journals, questionnaires, and interviews all supported the idea that to understand knowledge from anatomy, kinesiology, and neuroscience in participants' dancing meant seeing images, conversing, experiencing in movement, giving and receiving feedback, and placing this knowledge in familiar dance phrases all within the container of one class.

The crucial step in learning was placing the content into one's own somatic experience before full-out dancing. This required the dancer to analyze and bring awareness to their anatomy and movement potential in an environment that allowed for exploration and sensing before application to external form. Sessions were less about the content of 'what' we learned, and more about 'how' its application was facilitated. Offering various options when it comes to language and imagery assisted dancers in making choices, and discovering a learning approach that worked for them. As the facilitator, I found myself constantly questioning the participants: How do you sense your ligaments? How can they support you, and assist your return from this action?

When asked how her knowledge of anatomy, kinesiology, and neuroscience grew during the workshop, Lily replied, "I was really able to put it in my body." Marie reported, "I actually had to write a paper for Modern about how you had us explore the Basic 6 Bartenieff Fundamentals and what we could change to make it feel different during our experience. In other classes we just did the movements, so having both made it make more sense." Kay said,

> It has been helpful connecting specific parts of a system to concrete movement, rather than talking about the structures on their own and then saying "let's dance." Having to make these direct connections was different, I hadn't approached anatomy this way. It was always "here is what it is." Connecting it to how your body is working in the movement was really helpful.

Through facilitating the workshop, I was stunned by the depth of exploration enabled by one small concept or image. Each day, I was eager to offer more information to the participants. I remained in a constant self-check asking myself, "what really matters?" What did I hope they would understand? How little can I say about the details of each muscle? Can I instead show them images, let them look closely, talk briefly about

function, and then take our brief and simple concept into movement? The purpose of these mini-lectures, conversations and images was to help them in their dancing. In week three I realized that we needed to be dancing more, and talking and having "slowed down" sensory experiences less. By then, we had a foundation of words, images, and concepts to pull from, therefore day 3.2 was a peak day for learning.

Repetition

Through the journals, I discovered the crucial role repetition plays in developing understanding. Over the course of eight weeks, we danced eight different phrases: 1) an X series containing Laban-inspired movement and going to and from the floor, 2) a standing phrase dealing with spinal articulation in all planes, 3) a plié combination containing coordination patterns of the spine and weight shifts, 4 & 5) two across the floor sequences (one traveling forward, one traveling backward), 6) a center weight shift phrase with undercurves, translations and overcurves, 7) a fondu phrase, and 8) a six-step phrase, or culminating combination. These were introduced gradually over the eight weeks. My intention was to train the motor patterns and spinal coordination patterns in the Phrase A and Phrase B without referring to the phrases directly. The *Choreographic Intent* of the eight practice phrases was largely sustained and fluid, replicating the intent of Phrase A. Towards the end of the workshop, we began to work in a quicker pace, spending more time dancing, and exploring different qualities of movement. We never did get to rehearsing the aesthetic performance required in Phrase B.

I was seeing and sensing such profound shifts with the intent of Phrase A, I did not feel like shifting to an increased dynamic range would be beneficial in the workshop.

I was also curious if training the motor patterns was enough, or if training the choreographic intent was necessary in transfer. This concept of transferring across choreographic intents reflects the eclectic nature of contemporary dance, as often when dancers improve in one aspect of their skill, the challenge of where to apply this new information shifts.

As we moved through the body systems in relation to the spine, the movement phrases stayed the same, but the language and cuing changed. Over the course of the workshop, participants chose images and experiences that worked for them, and placed them in the existing phrases. Not needing to learn new material for each week allowed them a freedom and trust enabling transfer of concepts into their dancing. This leads me to believe repetition itself is somatic if done in a mindful manner. It allows the dancer to experience the difference in each day, and each performance of the phrase, thus facilitating transfer of new knowledge if the prompt, and environment to do so is offered. The potency of combining a somatic approach with dance science was confirmed through self-reporting of the participant's experiences, as they all sensed changes in their movement during the workshop, and how they learned and performed in the exit process.

The Movement Phrases

One of the first steps I took in this research was deciding how to assess contemporary dance skills. The use and integration of the whole spine in movement is typically what I attend to when watching other dancers. Whether the spine is acting as a mobilizer or stabilizer, its integration facilitates efficiency. In teaching, I often find that it is also a source of mystery because of words that can be used in dance classes like

"straight," "flat back," "lift," "arch," "contract," and "tuck." Often in a studio setting this language is offered (and imitated) without an understanding of the complexity of the structure, or the sensory knowledge needed to execute the intended movement in a healthy and efficient manner.

In creating movement for the study, I first created Phrase A. My intention was to include all possible spinal coordination patterns from different bases of support, through weight shifts, on and off balance, and to and from the floor. The music was in ¾ time, and the movement quality fluid and sustained keeping the action close to the core. I then created Phrase B, a re-ordering of the movement in Phrase A with a more explosive and quick hard-hitting quality, set to a faster-paced, pop song. Phrase B included high battements, jumps, turns, and rhythmic accents as peripheral extensions of the spinal coordination patterns and motor patterns in Phrase A. As I finessed the movement, particularly while working with the expert dancer, I continued to clarify the differences in the *Choreographic Intent* of Phrase A and Phrase B, while maintaining the coordination patterns in the spine.

In this research, significant motivation and trust in me, the researcher, provided an environment of open and clear communication throughout the study, thus enabling growth in the participants. In the treatment group, every participant except Emma had taken at least one of my technique classes. I knew Emma well from the Department of Dance, and was in a rehearsal process with her during the study. Self-perceived change was part of the research question, therefore each participant sought change throughout, motivating them to participate fully throughout the workshop. Additionally, the design of

the research intended to engage the participants by motivating them with aesthetically exciting movement upon entry.

Judge's Assessment of Skill Improvement

As shown in the judging results, positive change in Phrase A was consistent in all variables across the treatment group. In the workshop, movement with the choreographic intent of Phrase A was highly practiced with attention to the spine. No regression was exhibited in Phrase A by the treatment group, and overall improvement across the group was the result of the workshop. The control group showed some improvement in Phrase A, but not across all participants. Those who improved the most in *Use of Spine* variable were participants who were involved in the Department of Dance during the study. The improvements in the other variables were less than the treatment group.

In Phrase B, the treatment group showed improvements in all variables for those who began as lower scorers, however improvement across the group was less consistent. Some participants even stayed the same, and one regressed in both *Use of Spine,* and *Choreographic Intent.* This is notable because several of the participants reported Phrase B as "easier to learn" than Phrase A, or where Lily "got to apply everything from the workshop." In the control group, improvement across variables was also inconsistent, and exit scores were in a similar range to Phrase A.

It is my conclusion that the slower tempo, and less thrilling dynamic of Phrase A allowed participants in the treatment group to show change in their movement patterning because they could rely on their unconscious mode of attention. The phrases practiced in the workshop mimicked the feel of Phrase A, so they had established spinal coordination

patterns, ideas of how to move with that choreographic intent, and identifiable sensations in that dynamic range. This is supported by research in motor learning (Rosalie and Müller 2012; Willmingham 1998; Wulf, Shea, Lewthwaite 2010).

> According to the dual mode principle, the conscious pathway demands attention but the unconscious pathway does not. When an actor first performs a task, the unconscious mode cannot be used effectively; the task must be practiced for the sequencing, perceptual-motor integration, and dynamic processes to be tuned to it. Therefore, the conscious mode is used almost exclusively. With practice, the unconscious processes develop task-specific knowledge so that the unconscious mode can be used. Thus the task demands less attention with practice (Willmingham 1998, 577).

The movement and intent in Phrase B was more familiar to many of the participants because of their backgrounds in dance studio jazz, ballet and dance team. Also, the timing was more defined than Phrase A, so they attended more to phrasing and shape when executing movement. Phrase B had extended movements like battements, jumps, attitude turns, and pops which caused the dancers to see the peripheral movement rather than the initiation and transition into the movement from the spinal coordination patterns. Two of the phrases practiced in the workshop had extended limbs, but these phrases were practiced the least, therefore the mechanical demands on the extended limbs may not have been supported by the training (Ranganathan, Krishnan, Dhaher, and Rymer 2016; Cohen 1993).

For many participants, the extended limbs, tempo, and aesthetic in Phrase B proved to be too challenging for them to execute fully in both entry and exit. Many participants had preconceived notions of these movements outside of this context, therefore they prioritized the end shape over the process of creating the shape. They were not allotted enough time to re-pattern existing movement strategies to integrate the spine

into the movement. I sensed this caused stress in the participants forcing them to revert to old patterns.

It was clear in the entry and exit process that stress levels were increased despite my attempts to create an open environment. The spatial pathways in Phrase A were challenging to learn from a video, but the initial challenge seemed to set up context for learning Phrase B. Phrase B was performed second both times, therefore some dancers reported experiencing fatigue by the time they were performing for the camera.

Because of their preexisting ideas of what the movements were, some of them also may not have seen the way in which the spine was integrated into the movements. Motor learning expert Daniel Willmingham (1998, 577) suggests that the first requisite to changing a motor skill "is that the participant must recognize that the explicit knowledge he or she has is applicable to the skill situation." Those who did prioritize integrating their spine may have received a lower score in *Choreographic Intent* because their attention was spent trying to integrate new patterns, at the expense of executing the aesthetic of the choreography.

I could tell in the exit phase that the treatment group was motivated to show change which manifested differently for each dancer. It was challenging them to consider sequence, performance, and new skill integration, therefore spreading their attention.

> Increased motivation to perform well causes an actor to use the conscious mode, because it usually leads to higher accuracy. The desire to perform well may be generated by introducing an audience, a competitor, or a reward for good performance. Performance becomes worse rather than better, however, if the skill is highly practiced to the point that the unconscious pathway can guide performance more effectively (Willmingham 1998, 578).

Because the skills in Phrase B were highly practiced in studio contexts before the training, their performance reverted to their unconscious mode, while in this context, staying in the conscious mode may have been helpful to them.

Lastly, when reviewing the data, there is a large spread across the *Phrase Material Retention* category. This refers to the challenge of learning a one-minute phrase in twenty minutes from a video, as each participant's score was varied regardless of their technical skill. *Choreographic Intent* was the variable that brought scores down in Phrase B results. However, the treatment group improved in the *Use of Spine* category in both phrases, suggesting the focus of the workshop facilitated change in participants' dancing.

My Experience Administering Quantitative Dance Research

As the researcher, I was present for all entry and exit processes, the duration of the workshop, judge calibration sessions, and two viewings by the judges. I kept a thorough journal throughout the process, often following the same prompts I gave to the participants for each session. I also journaled consistently about my lesson plans, and my experience facilitating the judging panels. I noticed as I continued to watch the dancers' performances by video, my value regarding the integration of the spine into movement deepened. It became apparent each time how important it is to me as a viewer.

Entry and Exit

I knew all but one dancer prior to this study, which enabled a pre-existing sense of trust. Several of the participants in the workshop had taken at least one class with me, ranging from beginning ballet to advanced hip-hop. They were comfortable with my

teaching style and approach to movement.

During the entry and exit processes, I wanted to create an open, positive, and welcoming environment, despite the controlled nature of the process. I sensed nerves from the participants upon entry, partly because they didn't know the movement content. They all danced in nude colored clothing to enable the best visibility in a studio with black curtains and floors, a vulnerable task. During the exit process, participants were familiar with content, process, and environment, therefore their nerves lessened. Most dancers seemed to get less fatigued during the exit phase, either because they knew to conserve their energy, or they had been dancing all term. In both entry and exit phases, the presence of learning processes as a critical part of the quantitative data collection was profound. Participants were open with me about the challenge presented in the phrase material and the task of learning from a video. I encouraged them to dance the "version" of the phrase they knew after 20 minutes learning from a video.

My sense upon entry (and throughout the process) was the participants were motivated to learn. In their entry interviews, they all expressed excitement about wanting to improve their dance skills. This alone provided an advantage in the potential for success in the transfer from motor learning to skill execution. In the entry and exit processes, I attempted to create an open and light-hearted atmosphere, however performing for a camera can be quite nerve-wracking. In the same way, substantial learning can happen without a change in skill performance (Stanton 2011). The movement material was complex; in order to perform a progression of new skills, motor learning must be integrated through conscious and unconscious processes. This supports Kay's sentiments that the changes she sensed may not be observable by the judges. It is

important to note that of all the participants, Kay's improvement was seen the most.

Judging Panels

In preparation for the judging panels, I sifted through all three takes of each phrase from each participant upon entry and exit. In doing so, I watched each participant several times. Each time I watched, new idiosyncrasies in their movement stood out. Their body language in the brief moments before starting and finishing the phrase was reflected in their performance. Some participants exhibited fidgeting nervousness, some stood in position ready to perform, and some counted off the introduction.

In the judging calibration sessions, my main task was to clarify the variables for the scoring rubric. This lead to in-depth discussion about the phrase work itself, and the values and biases of the judges. Our first meeting was after the entry process. A variable I had not considered (*Phrase Material Retention*) emerged after I experienced the entry process. Several of the participants were unable to execute the phrase material correctly after twenty minutes with the video, a consideration I had not included in the scoring rubric. I communicated with the judges what I had seen, and taught them the phrases. Together we came up with a variable to address retention.

After our two calibration sessions, the judges reported they felt prepared for the first viewing. Through both viewings (referred to as viewing 1 and viewing 2), it was clear each judge was engaged and invested in using the assessment tool to the best of their abilities. They reported a sense of relief when told to be consistent with themselves, prioritizing intra-judge reliability over inter-judge reliability. Judge B and Judge C were overall consistent with one another in their scoring. When scores are added, if one judge

is consistently higher (as Judge A was), it will not skew the results if they were consistent in their score inflation.

Judges' Experiences

After the second viewing, I asked the judges a few questions about their experience. Two judges had taught a few of the participants, but they reported it did not bias their scoring. Additionally, the coding and randomization of the clips provided no information about whether the performance was entry or exit. When asked about their values when assessing movement, themes emerged across all three judges: individuality and uniqueness, efficiency and health, clarity and adaptability. The judges greatly appreciated the clarity in the three variables for assessment (*Use of Spine, Phrase Material Retention, Choreographic Intent*), as it enabled them to keep their assessment within specific parameters. It was challenging to separate their own movement values and biases from the study, so the clarity of assessment factors was essential. At the same time, in the act of scoring, it was challenging for them to keep the three variables separate, as they came to realize through judging that they may not be separate. Specifically pertaining to *Phrase Material Retention,* they all felt that despite the need for the variable, whether the dancer was performing the correct movements influenced all variables.

I provided them a rubric during the scoring session (Table 3) which they all referred to as helpful in the act of judging, defined as comparing each clip to the expert dancer (as opposed to what they may think the best performance might have been). In the viewing sessions, they viewed the expert dancer every 13 clips as a reminder of the

"perfect score." The judges reported it helped to continually refer to the performance of the expert dancer.

When asked about their experience in the first viewing versus the second viewing, the judges expressed uncertainty in their own reliability. They mentioned, as time went on, they started to notice other aspects of the performance of each dancer, not necessarily relevant to the parameters of this research. To me, this shows that the variables became clearer because they were able to differentiate what they needed to see for the purposes of this research from other idiosyncrasies in each performance. Their experience on this panel allowed the judges as researchers and scholars to think critically about how they observe, assess and teach movement. They said repeatedly that they appreciated the thorough organization and clarity in my approach to their role, and how this type of research could be done for several other variables. Judge C concluded by stating:

> What we do is hard: dancing, teaching dance, facilitating agency, choice and awareness in dancers and their movement choices. Teasing apart the qualities of "good dancing" is quite challenging. Can dance really be broken up in that way because so many movement qualities influence other movement qualities? But at the same time, that is what we do when we dance, when we teach dance. We think about one or two or three elements at a time – nuance them, change them.

My Experience

Administering this study was multi-faceted and complex, yet the immersive experience for me as a dancer and facilitator enabled extensive learning about my dancing and teaching. It clarified that for me, "strong technical dancing" is a result of one's integration with their whole spine, enabling expressive and efficient movement. I took great care in finding content to bring to each workshop, creating phrase work, and learning how to own my values and biases as a dance educator. I did not have to work

hard to keep the participants engaged in the workshop because of their existing motivation to improve their skills, and trust in me as a teacher. This provided me a freedom and permission to step out of my comfort zone as a facilitator.

The nature of dance research often engages limited control of extraneous variables, such as what other courses the participants are enrolled in, how much experience they have with the content, and if and how they choose to apply the training workshop in other facets of their dancing. Recalling the experiences of some of the control group participants in somatics classes and modern technique, the evolution in some of their answers in entry and exit interviews and questionnaires shows that they experienced other sources of information aligned with this research topic.

The Workshop

Facilitating the workshop was challenging, as while not a part of this research question, my largest consideration was how I was facilitating the workshop; a consideration of the pedagogy at the juncture of dance science, somatics, and contemporary dance. Many of the participants in the treatment group did not know each other prior to the research, therefore my first task was to create an environment that was safe, welcoming, and open. Day 1.2, I wrote about how Emma spoke intimately about her experiences showing her immediate comfort in the environment. In this act, she gave permission to others to be open and vulnerable.

As I re-watched the footage, I realized that a distinguishing aspect of our workshop was my desire to remain reflexive, in constant question of how I was facilitating. I used my voice often. I closely attended to my sensations, and what I was

seeing and feeling from the group. Each day, throughout, I was transparent about my intentions for the day, yet allowed the order of things to shift in the moment. While presenting content, I aimed to give them ownership of their own movement each day, and in each exercise. I would participate, trying to sense myself in movement, and often step out and watch, but remain embodied.

In my journals, I reflected on the material covered, the temperature of the group, and asked questions about my pedagogical choices. I also recorded decisions I made in the moment, reflected from emerging discourse and environment each day. Throughout, I was making discoveries in my body and my movement. My understanding of my spinal integration increased as I spent each workshop in a state of questioning, embodiment, and observation. In a space fostering curiosity and openness, I felt permitted as the facilitator to make discoveries, to not be "all-knowing." I often recall entering with a plan, but hoping to let the plan evolve based on their observations and experiences. I wrote reflections like, "I just realized the spine not only connects the three body weights, it goes into and through them," and, "I learned a lot about facet joints, and how many there are. Through teaching, I solidified information for myself about joints and joint actions."

After each workshop, I went to my office and typed the participants' journal responses. This allowed me to recall what had happened in the session, and immediately transcribe their experiences. Through this process, I made choices about my approach to the next session. Towards the end of week three and week four, I noted that we needed to dance full-out more in the workshop, or application of the concepts may not occur in the participants' dancing in the exit process.

Maintaining the same body of material each session allowed the participants time to transfer concepts into their dancing in the workshop. When done mindfully, repetition itself can be somatic (Stanton 2011). As Stanton (2011) confirms, "The aesthetic goals for dance technique are not achieved through mindless repetition" (89). Through repetition, dancers are enabled to experience of the differences with each performance, in each day. This can serve as motivation for dancers to transfer new knowledge into their dancing, if the environment and prompt to do so is supported. I discovered through the results of these participants, the ability to transfer ideas across contexts varies for each dancer. For some, training the concept was not enough, they also needed to train in the intent of the phrase, as seen by the overall greater improvement in Phrase A.

I started to note big changes in their movement patterns days 3.2, 4.1, and 4.2. Prior to these days, in 2.2 I noted they made big discoveries. My journaling during the workshop dropped off for a few sessions in the middle of the workshop, and I picked it back up in week six when I began to see significant change again. I wrote about the value of repetition, their engagement with themselves, the material and each other. In day 7.1, I said after reviewing my journal thus far, "I am realizing that I have more questions than answers." On the final day 8.2, I noted how much change I had seen, and sensed in the space the last few weeks, and wondered if it would be observable to the judges. Because of my experience in a learning environment with the participants, I knew they had changed in their understanding and dancing. The question was now about if they could transfer it to their performance.

Suggestions for Further Research

This study combined dance science and somatics in relationship to the use of the spine. Not only is the focus on the spine in line with my values as a dancer, it is posited that a deep understanding of spinal anatomy, function, and integration, can enhance dance skill (Clippinger 2016). I thought focusing on the spine would allow for the greatest change. Further research on the effects of this type of training program with a different anatomical focus would support somatic approaches in dance training and provide continued support for the transfer of dance science and somatics into dance performance. Additionally, facilitating a similar training program with a larger group could assist in further clarifying its integration and effectiveness in a large-group environment. The duration of this research study was inside of an academic quarter (eleven weeks). A similar study with a longer duration may provide different results, and allow for further integration of movement concepts.

In the creation of the assessment tool, I used videos of beginning dancers and the expert dancer performing Phrase A and Phrase B to calibrate the low-end and the high-end of the scale with the judges. When using a 5-point Likert scale, this left the scores of two, three, and four subject to judges' interpretation. When looking at the data, these scores were most commonly allotted to the participants during scoring sessions. While we engaged in lengthy conversations about what they may look like, not having videos that represented the skill levels of the participants prior to the panels created a challenge in clarifying the scale. If I were to repeat this method of analysis, I would gather video clips of dancers of all skill levels, with an emphasis on the skill level of the participants in the research. This would enable a clearer calibration of the nuances of the tool.

Lastly, research with a methodology designed using inferential statistics could verify objective quantitative results. However, use of a within subjects design and analysis, as opposed to a group design and analysis, enables the discovery of idiosyncratic results between subjects that may not be visible if data are pooled in a group analysis.

Concluding Thoughts

As dancers and educators live amidst the eclectic and evolving nature of contemporary dance, it is important to continue questioning how training approaches can best be integrated into the technique class.

> In framing the technique class as a 'laboratory' and working with principles and not codes; creating problems to solve, rather than setting pre-ordained goals, students can be encouraged to discover a movement experience without being shown a goal or outcome. In engaging with a process where there is not a prescribed point of arrival, it becomes possible to learn something about yourself as you learn a means to dance. (Stanton 2011, 88)

The premise of this research was to investigate learning processes at the juncture of dance science, somatics, and contemporary dance in relationship to skill execution. Regardless of the setting, each group of students is full of different individuals. Motor learning and transfer theory suggest attention is crucial in the transferring of skills across contexts (Rosalie and Müller 2012; Wulf, Shea, and Lewthwaite 2010). When close attention is paid to the transfer of learning, this research suggests a somatic approach to anatomy, kinesiology, and neuroscience can help dancers improve both in their understanding and technical skill execution.

APPENDIX A

JUDGING SCORESHEET

Judge _____ Clip____

Use of Spine _____

Phrase Material Retention _____

Choreographic Intent _____

Judge _____ Clip____

Phrase Material Retention _____

Choreographic Intent _____

Use of Spine _____

APPENDIX B

PARTICIPANT QUESTIONNAIRES

Entry

Please consider that there are no "right" or "wrong" answers, only "your" answers. Spelling/Grammar/Syntax is not important in the collection of this data.

1. Do you have knowledge of anatomy, kinesiology, neuroscience? If yes, is this knowledge specific to dance?

2. What do you know about your spine and how it moves?

3. In movement/dance, do you think about your spine when you are balancing or falling? If so, how? If not, is there something else you think about?

4. In movement/dance, do you think about your spine when you are moving in and out of the floor (in low space (floorwork) or high space (jumping))? If so, how? If not, is there something else you think about?

5. In movement/dance, do you think about your spine when you are shifting your weight (moving) through space? If so, how? If not, is there something else you think about?

6. When you are in a dance class what are your strategies for learning and retaining movement/dance?

7. In movement/dance, what do the following words mean to you?

Dynamics:

Phrasing:

Space:

Breath:

Sensing:

Connectivity:

Initiation:

Exit

Please consider that there are no "right" or "wrong" answers, only "your" answers. Spelling/Grammar/Syntax is not important in the collection of this data.

1. Has your knowledge of anatomy, kinesiology, or neuroscience changed this term? If so, how?

2. What do you know about your spine and how it moves?

3. In movement/dance, do you think about your spine when you are balancing or falling? If so, how? If not, is there something else you think about?

4. In movement/dance, do you think about your spine when you are moving in and out of the floor (in low space (floorwork) or high space (jumping))? If so, how? If not, is there something else you think about?

5. In movement/dance, do you think about your spine when you are shifting your weight (moving) through space? If so, how? If not, is there something else you think about?

6. Do you think your answers to the previous 3 questions changed over the course of the term? If so, how?

7. Has your dancing improved this term? Is there something specific you attribute this to?

8. When you are in a dance class what are your strategies for learning, and retaining movement/dance? Have these evolved this term?

9. In movement/dance, what do the following words mean to you?

Breath:

Sensing:

Connectivity:

Initiation:

10. What was it like to learn the phrases again? Explain…

APPENDIX C

PARTICIPANT INTERVIEWS

Entry Interview

1. What is your name, pseudonym, age and year in college?
2. In what capacity do you know me (the researcher)?
3. What are your major and minor at the University of Oregon?
4. What classes have you taken/are you taking this term in the UO DANC or DAN Department, and what is your level placement for modern and ballet (if known)?
5. Talk about your dance background prior to coming to college.
6. Do you still participate in dance activities outside of academics?
7. What kind of other physical activity do you do on a regular basis?
8. Do you have/have you ever had a regular mind/body practice? If so, can you elaborate?
9. Have you studied Anatomy, Kinesiology or Neuroscience in school?
10. When you hear the phrase "dance technique," what comes to mind?
11. Is there an aspect of your dance technique you are interested in improving?
12. What inspired you to participate in this voluntary research study "The Effects of Science and Somatics on Dance Technique?"
13. What do you hope to get out of this experience?
14. Anything else you would like to share?

Exit Interview

1. What is your pseudonym, age and year in college?
2. What classes have you taken/did you take this term in the UO DANC or DAN Department, and what is your level placement for modern and ballet?
3. About how many hours per week were you in a dance studio?
4. Talk about your dance experiences this term both inside and outside of the department.
5. What kind of other physical activity did you engage in?
6. Did you have a regular mind/body practice, in classes or outside of classes?
7. How has your knowledge of Anatomy, Kinesiology or Neuroscience evolved?
8. When you hear the phrase "dance technique," what comes to mind?
9. Do you recall what you were interested in improving this term? Do you think this happened?
10. Is there a certain part of your dance technique you think improved or evolved this term?
11. What do you attribute this to?
12. (Treatment Group) Do you think the workshop affected this?
13. (Treatment Group) Is there a particular day/concept/part of the workshop that you think effected your dancing the most?
14. Can you name a few things you gained from this experience?
15. Anything else you would like to share?

APPENDIX D

WORKSHOP LESSON PLAN

Weeks 1-4: Spinal Coordination
Weeks 5-7: Spinal Integration
Week 8: Choreographic Intent

At the top of each journal prompt page provided to the participants was the following disclaimer:

Please consider that spelling/grammar/proper syntax/complete sentences are not required or expected in your journal. There are no "right" or "wrong" answers, only "your" answers. Sometimes our answers are no answer at all, and sometimes they may be in words/pictures/paragraphs.

Spinal Coordination

1.1 Introduction

Activities: Set the tone by explaining some days will be full-bodied- some days we will explore different movement modalities, some days we will learn using pictures and videos and skeletons, some days we will dance thoroughout. Reflect on about entry.

- First exploration: three body weights from *Bodystories* (Olsen 1991, 35-37). Read from her text. Sense them, image them. Consider how they are connected by and through the spine. Find a few bony landmarks on ourselves.
- Walk through the space thinking of the three body weights- How do you experience them in movement? Improvise about each one and then their connection to one another.
- Group conversation
- Lying body scan: Introduce a body scan. Bring awareness to spinal curves, the idea of neutral spine and pelvis. Allow for awareness of breath. Experiences three body weights and curves lying in supine, prone, and other positions.
- Walking down the spine" (Olsen 1991, 52) exploration as an individual, and with a partner. Read pages 49-51 (Olsen 1991) introducing spinal curves.
- Group conversation
- Finish with a walk/improvisation about spine integrating new information.

Journal:

Today, what did you find out about the spine?
Did you sense anything new in your spine?
Is there a specific image, activity or concept that you recall? If so, Why?
Is there anything else the previous questions brought up for you?
Do you have any other questions or thoughts after today's workshop?

1.2 Bones

- Start in supine body scan. Re-read page 49-50 from *Bodystories* (Olsen 1991). Use language 1.1 about three body weights. Does this mean they are heavy? What is their quality? Try to sense the spine as a curvy snake-like connection between each body weight.
- Improvisation cued through initiation to come to standing.
- Introduce first dance phrase:
  "Spinal Warm Up"
  Standing in parallel (right and left side), wide parallel, first position and second position. No counts, no meter.
  Circumduction of the cervical (head), add thoracic, take lumbar down. Plié, stretch. Roll up to vertical, reach arms out and up, lateral flexion into circumduction to the front, find knee caps and open to long spine with straight legs, flex knees and spine and open to roll up opening arms and thoracic spine to hyperextension. Stack up to vertical, drop swing arms through rotation to each side regathering in at the top. Roll down to full flexion, shoot to plank, walk back and roll up. Other side.
- Look at 3-D skeleton model. Note and converse about observations regarding bones.
- Read "The Vertebrae of the Spine" from *Anatomy of a Moving Body* (Dimon 2008, 71-78).
- Repeat "Spinal Warm Up" in favorite leg position after reading.
- Introduce across the floor phrase:
  "Traveling Phrase"
  4/4 time
  Walking (with the feet and knees, vertical spine)- down 1, down 2, up 3, up 4, shift weight to right 5, shift weight to left 6, shift weight to right as the arms open and spine rotates right 7,8, walk on the left diagonal 1,2, toss arm and spine to lateral flexion 3,4, circumduction through the front plié 5,6, pivot turn through hyperextension step, step 7 and 8. Repeat.

Journal:

Today, what did you find out about the spine?
Did you sense anything new in your spine?
Were you able to connect any experiences from 1.1 to today's lesson?
If so, what and how?
Is there a specific image, activity or concept that you recall from today's workshop? If so, why?
Do you have any other questions or thoughts after today's workshop?

2.1 Joints and Joint Actions

- Powerpoint presentation. View joints in different sections of spine. Look at all pictures and converse. What are the different possibilities in each segment of the spine based on the structure of the bones and joints? Briefly go over and execute spinal coordination patterns. Introduce the idea that the spine is "like a ball and socket joint" because it can move in all three planes on all three axes.
- Spinal articulations lying supine: knee drop, head rotations trying to find center. Thoracic rotations with both arms in the air, hands together (Feldenkrais 1972),

sagittal bridging, and abdominal curls. Lateral flexion reaching hand towards same heel. Prone hyperextension.

Journal:

Today, what did you find out about the spine?
Did you sense anything new in your spine?
Were you able to connect our lesson about joints to any experiences from last weeks' lesson? If so, what and how?
Is there a specific image, activity or concept helped you to understand your joints, or the articulation possible in your spine? If so, why?
Do you have any other questions or thoughts after today's workshop?

2.2 Finding your center

- Converse in pairs/trios about what is sticking from 1.1, 1.2, 2.1. Share with group.
- Revisit body scan and repeat all movements from last time in an abridged way. Do you have a different experience today?
- Bring to standing and rock forward and back on feet to find center. Take this on a walk. Introduce the concept of "acture" from Feldenkrais®.
- Read "Finding your Center**"** (Dowd 1981) and perform exercises she suggests standing in a circle as a group.
- Talk about the pelvis as the handle to the spine. Relate to three body weights.
- Read from *Dance Anatomy and Kinesiology* plumb line (Clippinger 2016, 77-83). With a partner, use bony landmarks to help them identify their center. Watch them walk.
- After both partners, take this idea of center into a solo improvisation.

Journal:

Today, did you sense anything new in your spine?
Were you able to find a sense of center? Was this new, or familiar?
Is there a specific image, activity or concept that helped you understand the idea of center? If so, why?
Are you aware of your center in movement? What are some tools that help (or could help) your awareness?
How do your spine and your center relate?
Do you have any other questions or thoughts after today's workshop?

3.1 Ligaments

- Body scan
- Teach "X" series:
  Slow ¾ time.
  Body half on each side (second time through quicker with a "starfish" unfurling on each side). Body half to hug of top leg when seated each side. Body half to leg swing, use momentum to come up and over so hands are on the floor. Roll up to standing in fourth. Fondu back leg as spine finds hyperextension. Circumduction to monkey roll down to floor. Open stretch top arm and hips, descend back down to X. Other side.
- Powerpoint to view spinal ligaments. Talk about the quality, texture and feeling of ligaments.
- Watch Leslie Kaminkoff (2011) video "Simple Principles of the Spine."

- Revisit X series
- Teach "Plié" exercise:
  Quick ¾ time, repeat in parallel first and second, right and left
  Begin facing left diagonal. Undulate down leading with pelvis 1-8 up 1-8, same thing leading with head 1-8, up 1-8.Plié, stretch, elevé, lower (repeat with port de bras) 8 counts. Plié with flexion 1, stretch with lateral flexion to the right 2, plié flexion center 3, stretch with lateral flexion left 4, plié 5, stretch to neutral 6, plié with hyperextension 7, stretch. Limón circumduction with arms to the right 1-4, left 5-8. Under curve weight shift with right leg in parallel, return 1,2, under curve forward 3, step back into big lunge with open arms and hyperextension through spine 4,5, rebound back to standing on front leg with neutral spine 6, turn out to first position 7,8. (In second, we worked spinal undulation through lateral flexion for the last 8.)

Mid- session Journal:

Today, do you sense anything new in your spine?
How do you experience your ligaments?
Are you attending to the coordination of your spine in: (and if so, how?)
Weight Shifts
Going In/Out of Floor
Being On/Off Balance

- Group conversation
- Back to "Plié"
- Move through space in different kinds of weight shifts as improvisation.
- Teach "Falling Backwards Phrase:"
  Quick ¾ time
  Moving across the floor, facing away from center of the room. Quick ¾ time.
  In rotation: translate to a weight shift (an under curve ending in fondu) with right leg on left diagonal (vertical spine) 1, return and transfer through second position demi pointe 2, other side 3,4, repeat 5-8. Again with a wrapping of spine forward towards front leg, returning through neutral 1-8. Back to vertical spine 1, shift backwards 2 falling backwards and wrapping spine and arms in rotation off axis, two steps to wrap and fall other direction 3,4, two steps to face side and lean falling laterally 5,6, pivot turn in hyperextension all the way to flexion in parallel 7, rebound up to neutral, and 8.

Journal:

After dancing again, do you have any further thoughts about spinal coordination?
Did you have any new experiences?
Do you have any other questions or thoughts after today's workshop?

3.2 Spinal Coordination Technique Class

- Find a partner and chat. We will remain with partners throughout class.
- Floating heads with partner.
- "X Series"
- Watch partner do "X Series" and give feedback. Repeat.
- Help and support partner find spinal extension/hyperextension standing.
- "Plié"
- Watch partner. Give feedback as observer.

- "Falling Backwards Phrase"
- Partner feedback

Journal:

Today, please just write about your experience in our movement session.
If you need a starting point, here are some things to think about: Breath, Sensing, Connectivity, Initiation.

4.1 Halloween—No workshop

Participants were asked to find three moments where they were considering the information we have been learning in other contexts outside of the workshop.

4.2 Spinal Coordination Synthesis

- Check in and talk about what they have been thinking about. Discuss and recap the past few weeks.
- Start supine with pelvic clock, head clock, articulation exercises from week 2 through flexion, lateral flexion, rotation and hyperextension. Cue connectivity through ligaments, sensing joints. Emphasize breath and initiation.
- "X" series.
- Group improvisation in a circle playing in all the actions of spinal coordination: Flexion, Extension, Hyperextension, Lateral Flexions, Rotations, Circumduction, Neutral, Undulation, Translation. Examine in each segment in isolation, and then in integration with whole spine.

Mid-session Journal:

The past 4 weeks we have been learning about the spine. We have focused on bones, joints, and ligaments and how they facilitate spinal coordination. This research is referring to spinal coordination as the following patterns: Neutral, Flexion, Extension, Hyperextension, Lateral Flexion, Rotation, Circumduction, Undulation, Translation. As dancers, we accomplish spinal coordination in different contexts all the time such as in weight shifts, on and off the line of gravity, and going in and out of the floor.
How do you experience spinal coordination patterns?

- Revisit "Traveling" phrase from 1.2. Repeat several times with new language.

Journal:

Please reflect on your experience these past four weeks focusing on the previous statement as a guide.

*In this session, half of the participants were absent, therefore they came to make it up the following week in the hour before session 5.1.

5.1 Muscular System

- Introduce Irmgard Bartenieff's Basic 6 by referring to her book *Body Movements* (1980), and using her language to facilitate movement explorations.
- Sense own muscles through an improvisation of spinal coordination movements that we did last time through each plane. "What muscles pull you there?" "What has to let go?"

Mid-session Journal

Today, do you sense anything new in your spine?
How do you experience your spinal muscles?

- Powerpoint of images of muscles connected to the spine/torso. We did not focus on details or names unless they asked.
- Improvise cuing from the muscles, how they "only pull," and using language of coordination patterns

Journal:

Does a specific idea, image or feeling stand out to you when reflecting on muscles?

Do you have any other questions or thoughts after today's workshop?

5.2 Nervous System

This is the day after the Presidential Election. In order to start, we had to debrief. It took about 30 minutes. I then asked them how they wanted to proceed with the content, and allowed them to choose the order of our class.

- Powerpoint of images of nervous system. Some images connecting nerve fibers to muscle spindles.
- Improvisation considering nervous system and muscles
- Body scan
- Bartenieff's Basic 6
- Teach "Weight Shift" phrase:
  Slow ¾ time, faster tempo to be introduced later
  Execute on right and left with a vertical spine, and right and left with a spinal curve towards the gesture leg. Parallel, and turned out.
  One undercurve en croix 1-8, translation en croix 1-8, overcurve en croix 1-8, walking scallop right 3 steps forward 1-4, 3 steps back 5-8, 3 steps forward suspend 1-4, finish the circle with 4 steps 5-8.

Journal: Today, please write/draw a few buzzwords, phrases, or images that have come up during our session. Complete sentences not necessary! Any other thoughts/questions after today's session?

Spinal Integration

6.1 Fascia and Anatomy Trains

Before the participants entered the space, I laid out the nine supplementary posters from *Anatomy Trains* by Thomas Myers on one side of the space (2014).

- Walk around space and take weight shifts to warm up
- X series on the ground to standing
- Talk briefly about fascia
- Look at posters
- "Plié" combination, but speed up articulation in the beginning
- Improvisation cued from spine as initiator, and spine as integrated between limbs
- Conversation: "What are you thinking about?"
- Read excerpts from *Anatomy Trains* (Myers 2014)
- "Weight Shift" phrase in groups, watching each other and conversing about what we see.

Journal:

How do you experience your fascia?

Does a specific image or movement concept stand out to you when reflecting on fascia?

How does your fascia relate to your spine when dancing? Anything else?

6.2 Movement integration

- Look at *Anatomy Trains* (Myers 2014) posters again
- Warm up with Bartenieff's Basic 6
- "X" phrase
- "Plié" phrase
- "Weight Shift" phrase
- Fascia Improv

Mid-session Journal:

What are you sensing today as we move through different movement experiences?

- Teach "Six Step" phrase:
  Quick 6/8 time, right side and left side
  Circle (down up up, down up up) with vertical spine 1-6, circle with circumduction of cervical and thoracic spine 1-6, add arms with circumduction 1-6, plié second position with spinal flexion and arms in second 1-6, drop to thoracic and cervical hyperextension and open arms in "v" 1-3, pull from fingers to open to vertical with arms in second 4-6. Limón plié to the right through lateral flexion and circumduction 1-6. Repeat left catching in forward flexion 1-3, undulation in deep lunge to back rond de jombe to side tilt in second 4-6, 1-6. Two steps to counter balance arabesque leg and arm 1-6. Piqué on back leg in passé 1-3, two half turns in coupé opening arm for momentum 4-6, 1-3. Half Fondu in lateral flexion 4-6, toss to lateral flexion on the other side to cirumcumduct and articulate through and undulation in lateral flexion pulling you off balance 1-6.

Journal:

How did you experience your spine today?

Are you finding integration of your spine through your movement (or movement through your spine?)

7.1 Technique Class

- Participants spent time going through their journals and noting themes and ideas they have discovered throughout the term.
- Walk through space asking them to reflect on what they read while they get warm
- Body scan bringing themes and ideas to their awareness that they read in journals
- "X" series- during this I asked them to remember the images and ideas they are holding on to, and to give themselves notes throughout.
- Plank position, cuing attention to the curves of the spine. "Where are the curves of your spine?" "Has your head fallen off"
- Walking, and improvisation around slow sustained movement integrated limbs to spine. Long improvisation in slow tempo fighting against fast music. I asked them to explore from where they are comfortable whether limbs into center, or center out to limbs. I asked the play and study actions that are comfortable and

uncomfortable for them. I asked them to try to transfer ideas from the workshop, and their writing. We brought up the tempo trying not to let go of the awareness and exploration in slow tempo.

- Conversation- everyone say one thing they are working on.
- "Plié" (add hyperextension to the lateral flexion section for a full circumduction rather than swinging through flexion after going to one side).
- "Weight Shift" phrase – we dissected the action of the standing leg based as initiator on what I saw in them to connect foot to pelvis and integrate the spine.
- "Weight Shift" phrase at a faster tempo
- Teach "Fondu" phrase
  Slow ¾ time
  Developpé front 1,2, fondu flex the foot 3, stretch tendu 4, repeat side 5-8, repeat back 1-4, repeat side (no tendu) 1-3, 4 extend into lateral tilt away from leg, plié second circling to opposite tilt 5,6, return to first side tilt 7,8, hands to floor roll to ground from X series 1-4, open into big extension 5,6 retrograde to plant standing leg and rond de jambe to pique with gesture leg to side 7-4, extend back to second side tilt and undulate with big enveloppé side 5-8.
- "Falling Backwards" phrase
- "Six step" phrase
- Body scan

Journal:

What ideas did you take with you today after reviewing your journal at the beginning of the workshop?
What moments or activities stand out from today's workshop?
Are you finding spinal integration today?

7.2 Thanksgiving Break.

Participants were assigned to notice when they thought about the workshop in their life, and to go through some of the supine movements we had been practicing 2-3 times on their own over the break.

Choreographic Intent

8.1 Time, space, effort, initiation, breath

- Look at original Netter book of drawings of the spine
- Conversation to share what they were thinking about over break
- Ask for them to share questions, and check in about "transfer"
- Read excerpts "Inner Impulse to Move" from *Body Movements* including the quotes by Laban (Bartenieff 1980).
- This initiated a conversation about technique as transitions and "how" you get there, and an introduction of the relationship of time, space, effort, initiation and breath as critical to acquiring skills. This conversation was notable.
- Body scan cued from the spine, and then a second scan cued from the limbs
- Supine warm up using movements from earlier in the term (pelvic clock, abdominal curls, knee drops, bridging, body half) using imagery and language

that is not anatomical, but based on effort, initiation, space, time and breath. We worked extensively on articulation of the thoracic spine.

- Conversation
- Improvisational walk across the space forwards and backwards with each prompt: breath, effort, time, space-
- Improvise across the space with each prompt:
- Breath, effortful, effortless, time, spatial intent out, spatial intent in, initiating from the spine, initiation from spine with the spatial intent out, initiating from limbs with spatial intent out, initiating from the eyes
- Conversation

Journal:

After today's workshop, please write/draw for a few minutes about your experience. Consider these themes: Effort, Breath, Space (spatial intent), Time, and Initiation.

8.2 Final Technique Class

- Conversation: "Consider all of the things we talked about—what stood out to you and continues to be in your thoughts?"
- Body scan- cue transfer of information into dancing
- "X" series (no sound)
- Long improvisation with two different soundtracks bringing awareness to maintaining the integrity of their spinal integration regardless of the dynamic.
- "Plié" combination cued from effort
- "Falling Backwards" phrase cued from space and spatial intent

Mid-session Journal:

What are you thinking about/transferring into your dancing into today from this workshop in terms of the spine?

Is this at all influenced by our day where we talked about Effort, Breath, Space, Time, and Initiation?

- "Fondu" phrase cued from breath- slow tempo, and the quick in a 4/4.
- "Six step" phrase cued from time. Did it multiple times, watched people and had a partner experience to facilitate initiating from the crown.
- Final body scan
- Chat

Journal:

Please consider your experience in this workshop. Were there new ideas? Are there some specific "Ah-ha" moments? Did you sense change in your dancing?

APPENDIX E

PHRASE A JUDGING RESULTS

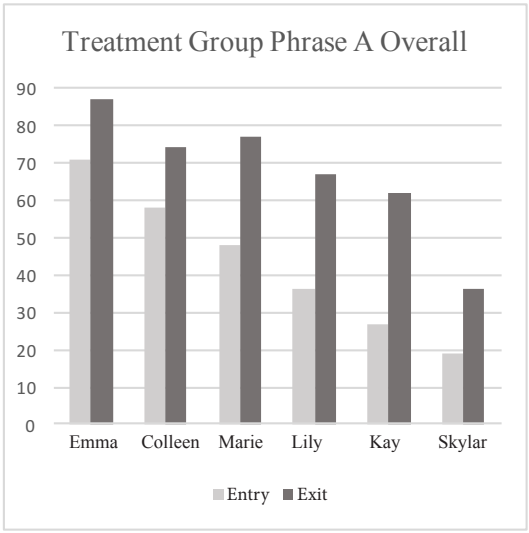

Figure 1 Treatment Group Phrase A Overall Results

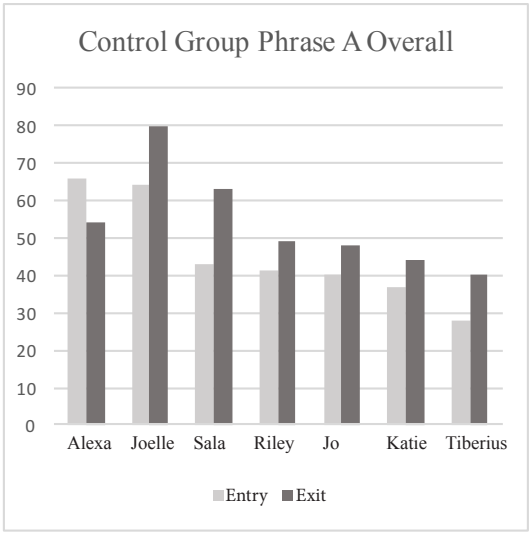

Figure 2 Control Group Phrase A Overall Results

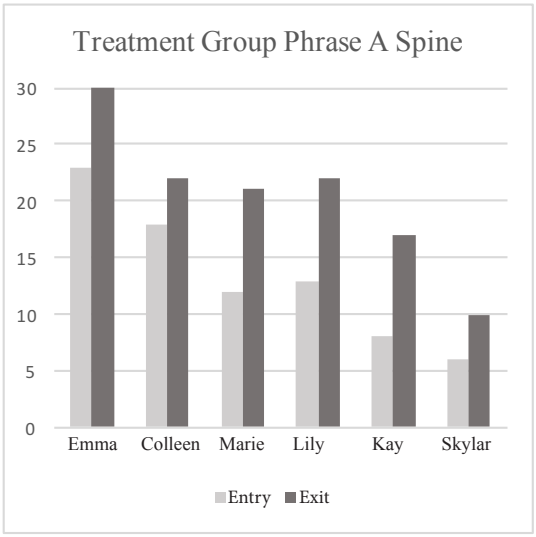

Figure 3 Treatment Group Phrase A Results: Use of Spine

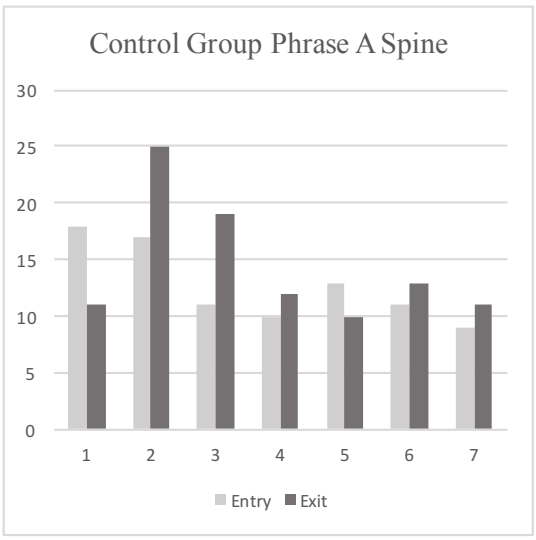

Figure 4 Control Group Phrase A Results: Use of Spine

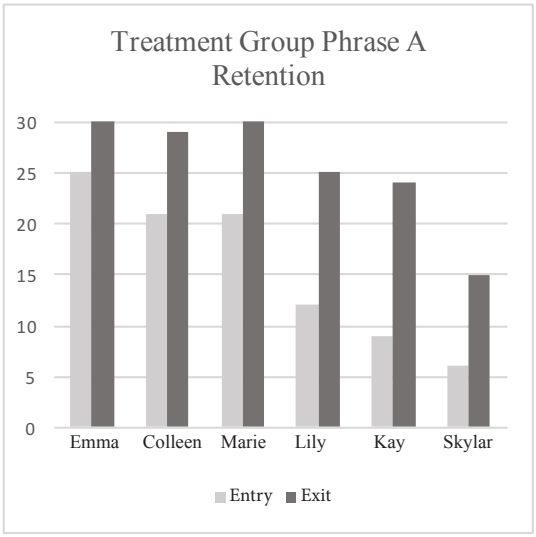

Figure 5 Treatment Group Phrase A Results: Phrase Material Retention

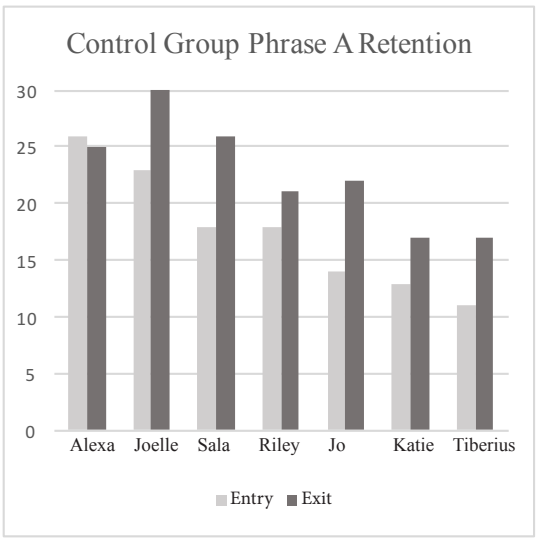

Figure 6 Control Group Phrase A Results: Phrase Material Retention

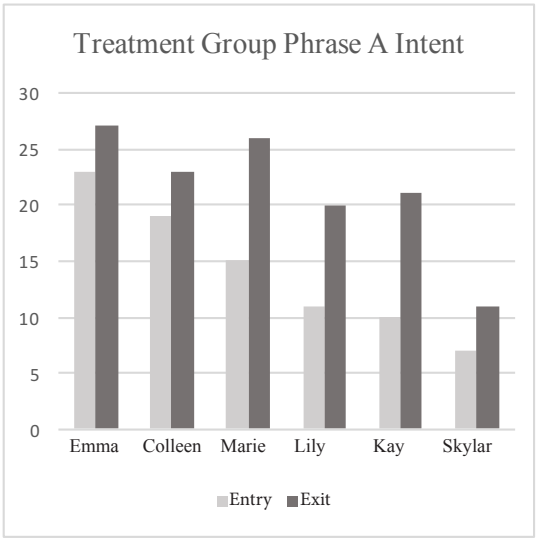

Figure 7 Treatment Group Phrase A Results: Choreographic Intent

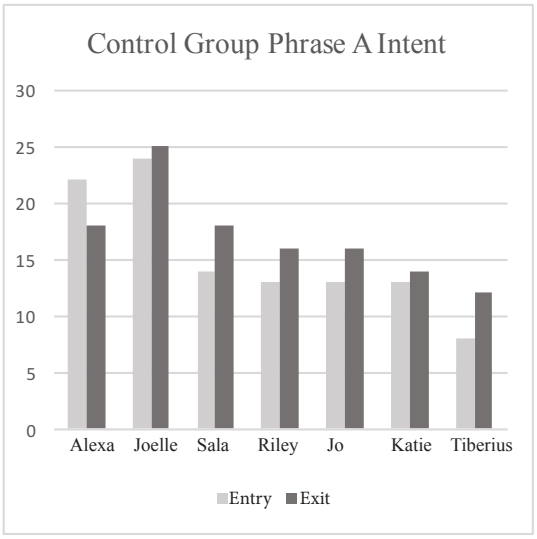

Figure 8 Control Group Phrase A Results: Choreographic Intent

APPENDIX F

PHRASE B JUDGING RESULTS

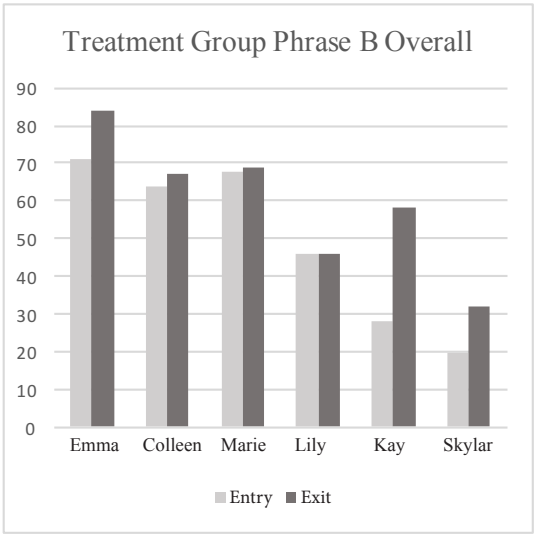

Figure 9 Treatment Group Phrase B Overall Results

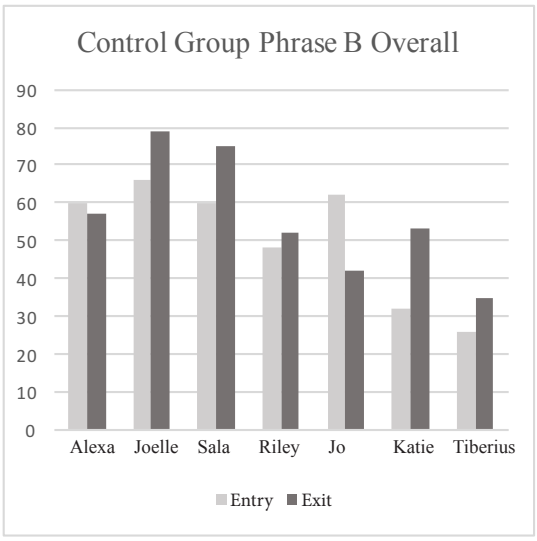

Figure 10 Control Group Phrase B Overall Results

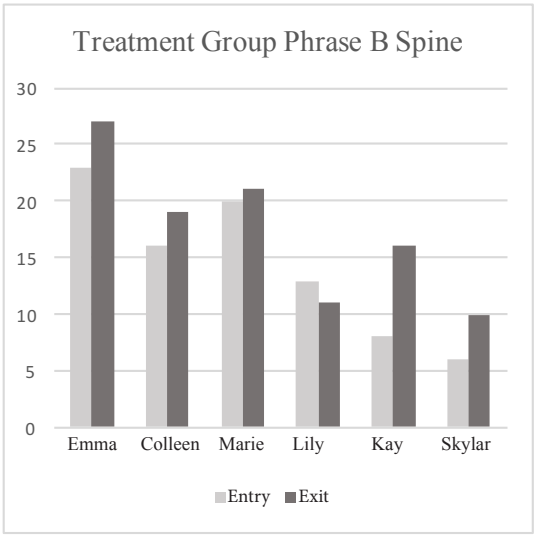

Figure 11 Treatment Group Phrase B Overall Results: Use of Spine

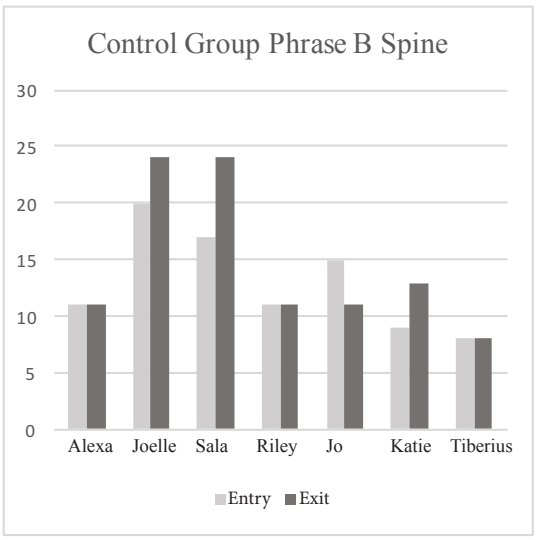

Figure 12 Control Group Phrase B Overall Results: Use of Spine

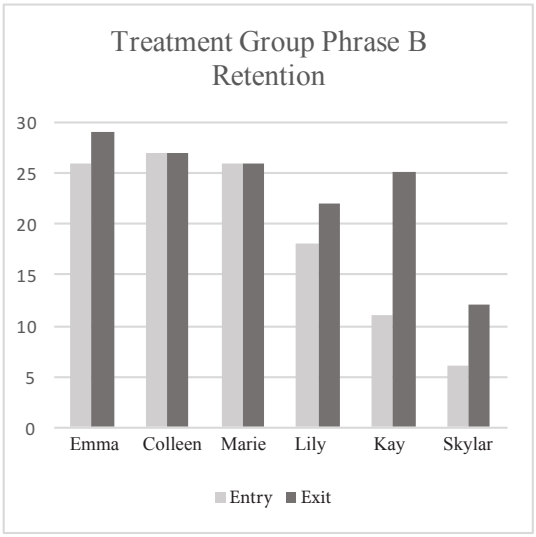

Figure 13 Treatment Group Phrase B Overall Results: Phrase Material Retention

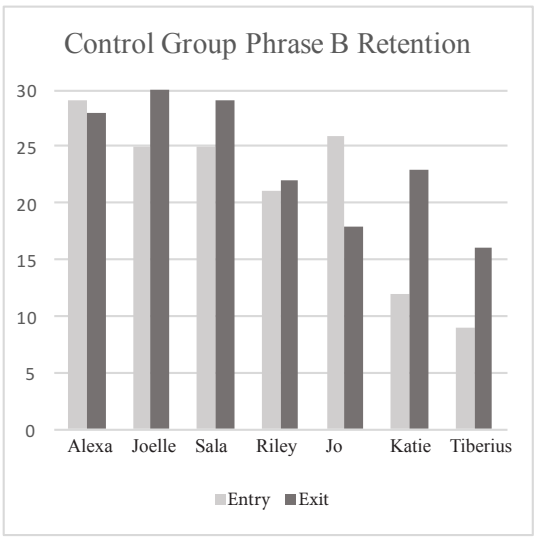

Figure 14 Control Group Phrase B Overall Results: Phrase Material Retention

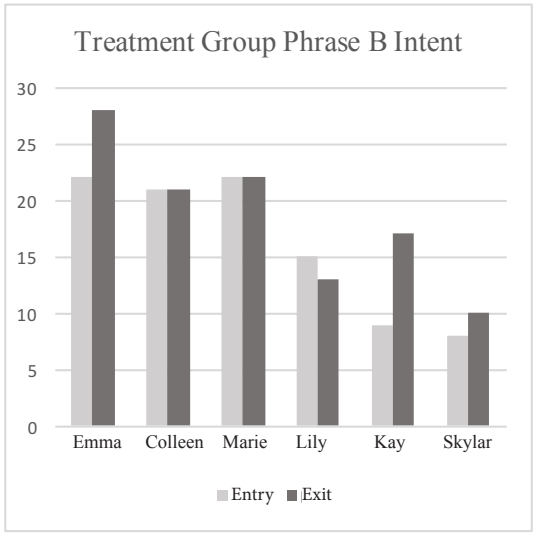

Figure 15 Treatment Group Phrase B Overall Results: Choreographic Intent

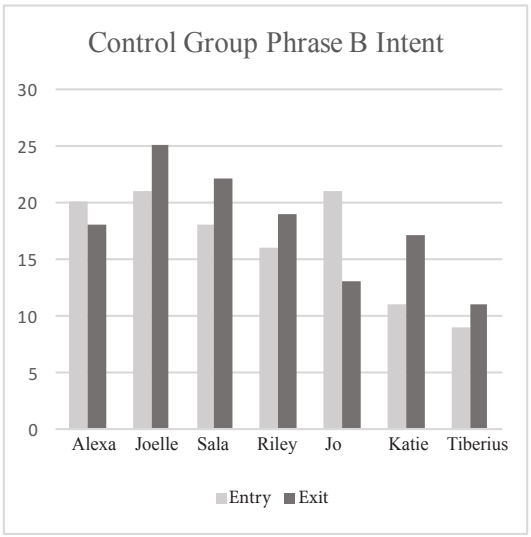

Figure 16 Treatment Group Phrase B Overall Results: Choreographic Intent

APPENDIX G

RECRUITMENT FLYER

UNIVERSITY OF OREGON

Attention Dancers!

Are you interested in learning more about your *Contemporary dance technique?*

What: FREE term long workshop aimed at improving your understanding of skills in contemporary dance technique.

When: MW 6:15-7:45pm
October 3- December 7
(time subject to change if needed)

Where: Gerlinger Annex 354

Why: Support dance training and education research

Who: Taught by Hannah Andersen, 3rd yr GTF & MFA Candidate

Project Description: Hannah Andersen, an MFA candidate from the Department of Dance at the University of Oregon, is seeking participants for her research study aimed to measure the effects science and somatics have on the execution of contemporary dance technique skills. You are eligible to participate in this study if you are a 1st, 2nd or 3rd year undergraduate who trained at a studio for 2+ years before coming to college.

To participate or request more information email, text or call:

hka@uoregon.edu // 509-951-2391

APPENDIX H

PARTICIPANT RECRUITMENT SCRIPT

Dear Dancer,

My name is Hannah Andersen and I am an MFA candidate from the Department of Dance at the University of Oregon. I am writing to invite you to participate in my research study aiming to measure the effects science and somatics in teaching have on the execution of contemporary dance technique skills. You're eligible to be in this study because you are a first-third year undergraduate with 2+ years of studio dance training. I obtained your contact information from University of Oregon Department of Dance.

If you decide to participate in this study, you will be asked to learn and perform two dance phrases for video recording in week 2 of fall term 2016. By participating you will be entered in a random selection to participate in a FREE workshop twice per week for 90 minutes, taught by myself. If you are not selected, you will be part of the "control" group. If chosen, we will meet from 6:15-7:45pm on Mondays and Wednesdays from October 3-December 9, 2016. If you are not available during this time, but are interested please let me know as we may be able to adjust the time of the workshop.

I would like to video record the duration of the workshop. I will use the recording of the workshop to collect and analyze data. Whether or not you were randomly selected to participate in the full workshop, you will be asked to relearn and perform the two phrases at the end of 10 weeks, the week of December 5, 2016. The dance phrase video recordings from the beginning and end of 10 weeks will be used for a judging panel after the workshop has concluded where your identity will not be disclosed. The judges will be rating performances on a scale which will allow me to discern if/how your contemporary dance technique improved. I will be happy to meet with you after the workshop to discuss your technique, and share the judge's scores with you.

Remember, this is completely voluntary. You can choose to be in the study or not. If you'd like to participate or have any questions about the study, please email or contact me at hka@uoregon.edu or (509)951-2391.

Thank you very much.

Sincerely,

Hannah Andersen

APPENDIX I

JUDGE RECRUITMENT SCRIPT

Dear _____,

My name is Hannah Andersen and I am an MFA candidate from the Department of Dance at the University of Oregon. I am writing to invite you to participate as a panel judge in my research study aiming to measure the effects science and somatics in teaching have on the execution of contemporary dance skills. You're eligible to be in this study because you are professional dancer/dance educator with a significant background in performance, somatics and/or dance science and experience in the collegiate setting. I obtained your contact information from my faculty advisor, Dr. Steven J. Chatfield.
If you decide to participate in this study, you will be asked to review the Skill Scoring Rubric (as provided in an email) prior to a judge calibration meeting. You will attend one meeting fall term lead by the researcher to discuss details and nuances of the judging rubric. The 4-6 hour judging panel will take place on one day in December 2016 after the conclusion of the research study. You will be scoring several 1-minute video clips in an environment highly controlled by the researcher. Participants in the videos will not be identified by the researcher.
I will be happy to meet with you after the data is analyzed and coded for confidentiality to discuss results.

Remember, this is completely voluntary. You can choose to be in the study or not. If you'd like to participate or have any questions about the study, please email or contact me at hka@uoregon.edu or (509)951-2391.

Thank you very much.

Sincerely,

Hannah Andersen

APPENDIX J

PARTICIPANT CONSENT FORM

University of Oregon Department of Dance Research Consent Form

University of Oregon Department of Dance
Informed Consent for Participation as a Subject in:
The Effects of Science and Somatics on Dance Technique
Investigator: Hannah Andersen
Type of consent: Adult Consent

Introduction

- You are being asked to be in a research study of the effects dance teaching have on contemporary dance skills.
- You were selected as a possible participant because you expressed voluntary interest and fit all of the criteria.
- We ask that you read this form and ask any questions that you may have before agreeing to be in the study.

Purpose of Study:

- The purpose of this study is to investigate the effects dance teaching have on contemporary dance skills from your point of view, and from a judge's point of view.
- Participants in this study are undergraduates living in Eugene, Oregon.

Description of the Study Procedures:

- If you agree to be in this study, we would ask you to attend workshop meetings in week 2 and week 11 for 90 minutes, 2 days per week. You will participate in all activities, including entry and exit interviews, entry and exit questionnaires, perform 2 dance phrases for a video recording in week 2 and week 11. You will be entered into a pool of random selection to participate in weeks 3-10 of the research. If randomly selected to participate in weeks 3-10, we ask you additionally attend workshop meetings for those 8 weeks. These workshops will be video recorded and you will be asked to keep a written journal which will be collected as data at the end of the research study.

Risks/Discomforts of Being in the Study:

- Foreseeable risks include loss of confidentiality in written materials and potential for injury. Data and code for pseudonyms will be stored on a password protected hard drive and written journals kept in the researcher's locked office where only the researcher has access. If an injury occurs, the participant will be asked to seek immediate medical attention. Further participation in the study will be determined by the recommendation of a medical professional. If the participant cannot fully participate, they will be removed from the study.

Benefits of Being in the Study:

- The purpose of the study is to measure the effects of dance teaching on contemporary dance skills.
- The benefits of participation may include improving your understanding of contemporary dance, improving your understanding of your dance technique, additional practice of contemporary dance skills, a meeting afterwards to debrief on your skill improvement from the researcher and the judge's scores, and a free learning experience.

Compensation:

- There will be no compensation for your service.

Costs:

- There is no cost to you to participate in this research study.

Confidentiality:

- The records of this study will be kept private. In any sort of report we may publish, we will not include any information that will make it possible to identify a participant. Research records will be kept in a locked file.
- All electronic information will be coded and secured using a password protected file. Only the researcher and faculty advisor will have access to the video recordings of the workshop, and the performance videos. All videos used by the three judges will be kept confidential. Videos will be destroyed within three years of the study end date.
- Access to the records will be limited to the researchers; however, note that the Institutional Review Board and internal University of Oregon auditors may review the research records.

Voluntary Participation/Withdrawal:

- Your participation is voluntary. If you choose not to participate, it will not affect your current or future relations with the University.
- You are free to withdraw at any time, for whatever reason.
- There is no penalty or loss of benefits for not taking part or for stopping your participation. By discontinuing your participation, the participant does not jeopardize grades nor risk loss of present or future faculty, school, or University relationships.

Dismissal From the Study:

- The investigator may withdraw you from the study at any time for the following reasons: (1) withdrawal is in your best interests, (2) you have failed to comply with the study requirements, (3) you are injured, and a medical professional has recommended you do not continue.

Contacts and Questions:

- The researcher conducting this study is Hannah Andersen. For questions or more information concerning this research you may contact her at hka@uoregon.edu or her Faculty Advisor, Dr. Steven J. Chatfield, stevenc@uoregon.edu.

- If you believe you may have suffered a research related injury, contact Hannah Andersen at (509)951-2391 who will give you further instructions.
- If you have any questions about your rights as a research subject, you may contact: Research Compliance Services, University of Oregon at (541) 346-2510 or ResearchCompliance@uoregon.edu

Copy of Consent Form:

- You will be given a copy of this form to keep for your records and future reference.

Statement of Consent:

- I have read (or have had read to me) the contents of this consent form and have been encouraged to ask questions. I have received answers to my questions. I give my consent to participate in this study. I have received (or will receive) a copy of this form.

Signatures/Dates

_____

Study Participant (Print Name)

_____

Participant Signature **Date**

APPENDIX K

JUDGE CONSENT FORM

University of Oregon Department of Dance Research Consent Form

University of Oregon Department of Dance
Informed Consent for Participation as a Judge in:
The Effects of Science and Somatics on Dance Technique
Investigator: Hannah Andersen
Type of consent: Adult Consent

Introduction

- You are being asked to be a judge for a research study of the effects dance teaching have on contemporary dance skills.
- You were selected as a possible judge because you fit all of the criteria.
- We ask that you read this form and ask any questions that you may have before agreeing to be in the study.

Purpose of Study:

- The purpose of this study is to assess specific contemporary dance skills of several dancers via video recording using the Skill Scoring Rubric (which looks at the use of the spine in contemporary dance) as provided by the researcher.
- Participants in this study are undergraduates living in Eugene, Oregon.

Description of the Study Procedures:

- If you agree to be a judge in this study, we would ask you to review the Skill Scoring Rubric (as provided in an email) prior to a judge calibration meeting. You will attend one meeting fall term lead by the researcher to discuss details and nuances of the judging rubric, as well as view videos representative of different scores to calibrate your eye. The judging panel will take place in December 2016 after the conclusion of the research study. You will attend the judging panel for 4-6 hours at the University of Oregon. The panel will consist of 3 judges who will all be scoring several 1-minute video clips in random order. This process and environment will be highly controlled by the researcher, and each video will receive 2 minutes total of your time to watch and score. Participants in the videos will not be identified by the researcher. After the conclusion of the scoring panel, the researcher will collect all rubrics, and no data will be available to you.

Risks/Discomforts of Being in the Study:

- There are no foreseeable risks for you participating in this study.

Benefits of Being in the Study:

- The purpose of the study is to measure the effects of dance teaching on contemporary dance skills.
- The benefits of participation may include an opportunity to continue honing your eye for dance skills, a greater understanding of the use of the spine in contemporary dance, participation in current graduate level research.

Compensation:

- There will be no compensation for your service.

Costs:

- There is no cost to you to participate in this research study.

Confidentiality:

- The records of this study will be kept private. In any sort of report we may publish, we will not include any information that will make it possible to identify a judge. Research records will be kept in a locked file.
- All electronic information will be coded and secured using a password protected file. Only the researcher and faculty advisor will have access to the scoring rubrics you provided. All rubrics will be destroyed within three years of the study.
- Access to the records will be limited to the researchers; however, note that the Institutional Review Board and internal University of Oregon auditors may review the research records.

Voluntary Participation/Withdrawal:

- Your participation is voluntary. If you choose not to participate, it will not affect your current or future relations with the University.
- You are free to withdraw at any time, for whatever reason.
- There is no penalty or loss of benefits for not taking part or for stopping your participation. By discontinuing your participation, the participant does not jeopardize grades nor risk loss of present or future faculty, school, or University relationships.

Dismissal From the Study:

- The investigator may withdraw you from the study at any time for the following reasons: (1) withdrawal is in your best interests, (2) you have failed to comply with the study requirements.

Contacts and Questions:

- The researcher conducting this study is Hannah Andersen. For questions or more information concerning this research you may contact her at hka@uoregon.edu or her Faculty Advisor, Dr. Steven J. Chatfield, stevenc@uoregon.edu.
- If you believe you may have suffered a research related injury, contact Hannah Andersen at (509)951-2391 who will give you further instructions.
- If you have any questions about your rights as a research subject, you may contact: Research Compliance Services, University of Oregon at (541) 346-2510 or ResearchCompliance@uoregon.edu

Copy of Consent Form:

- You will be given a copy of this form to keep for your records and future reference.

Statement of Consent:

- I have read (or have had read to me) the contents of this consent form and have been encouraged to ask questions. I have received answers to my questions. I give my consent to participate in this study. I have received (or will receive) a copy of this form.

Signatures/Dates

_____

Study Participant (Print Name)

_____

Participant Signature **Date**

REFERENCES CITED

Angioi, Manuela, George Metsios, Emily Twitchett, Yiannis Koutedakis, and Matthew Wyon. 2009. "Association Between Selected Physical Fitness Parameters and Aesthetic Competence in Contemporary Dancers." *Journal of Dance Medicine & Science* 13, no. 4: 115-123.

Bales, Melanie, and Rebecca Nettl-Foil. 2008. *The Body Eclectic: Evolving Practices in Dance Training.* Urbana and Chicago: University of Illinois Press.

Barr, Sherrie. 2002. "Examining the Technique Class: Re-Examining Feedback." *Research in Dance Education* 10, no. 1: 33-45. Accessed March 15, 2017. T&F Online.

Bartenieff, Irmgard with Dori Lewis. 1980. *Body Movement: Coping with the Environment.* Langhorne, Pennsylvania: Gordon and Breach Science Publishers.

Batson, Glenna, and Ray Eliot Schwartz. 2007. "Revisiting the Value of Somatic Education in Dance Training Through an Inquiry into Practice Schedules." *Journal of Dance Education* 7, no 2: 47-56.

Batson, Glenna. 2009. "Somatic Studies and Dance." *IADMS Resource Paper*. https://www.iadms.org/?page=186.

Batson, Glenna, Edel Quin, and Margaret Wilson. 2011. "Integrating Somatics and Science." *Journal of Dance & Somatic Practices* 3, no. 1+2: 183-193. Accessed February 15, 2016. http://dx.doi.org/ 10.1386/jdsp.3.1-2.183_1.

Batson, Glenna, and Margaret Wilson. 2014. *Body and Mind in Motion: Dance and Neuroscience in Conversation.* Chicago, IL: Intellect.

Berrol, Cynthia F. 2012."How to Mix Quantitative and Qualitative Methods in a Dance Movement Therapy Research Project." In *Dance/Movement Therapists in Action: A Working Guide to Research Options,* 2nd ed,. edited by Robyn Flaum Cruz and Cynthia F. Berrol. 233-250. Springfield, IL: Charles C. Thomas Publishers, Ltd.

Bläsing, Bettina, Martin Puttke, and Thomas Schack, eds. 2010. *The Neurocognition of Dance: Mind, Movement and Motor Skills.* New York, NY: Psychology Press.

Brodie, Julie, and Elin Lobel. 2011. "Integrating Fundamental Principles Underlying Somatic Practices into the Dance Technique Class." *Journal of Dance Education* 4, no. 3: 80-87. http://dx.doi.org/10.1080/15290824.2004.10387263.

Burnidge, Anne. 2012. "Somatics in the Dance Studio: Embodying Feminist/Democratic Pedagogy." *Journal of Dance Education* 12, no. 2: 37-47. http://dx.doi.org/10.1080/15290824.2012.634283.

Chatfield, Steven J. 2009. "A Test for Evaluating Proficiency in Dance." *Journal of Dance Medicine and Science* 13, no. 4: 108-114.

Clippinger, Karen. 2016. *Dance Anatomy and Kinesiology,* 2nd ed. Champaign, IL: Human Kinetics.

Cohen, Bonnie Bainbridge. 1993. *Sensing, Feeling, and Action: The Experiential Anatomy of Body-Mind Centering.* Northampton, MA: Contact Editions.

Daniels, Kathryn. 2009. "Teaching to the Whole Dancer: Synthesizing Pedagogy, Anatomy, and Psychology." *The IADMS Bulletin for Teachers* 1, no. 1: 8-10. Accessed February 16, 2015. http://www.iadms.org/?page=243.

Diaz, Heidi, Steven J. Chatfield, and Jan Cox. 2011. "Cultivating Presence in Movement: Student Reflections on the Practice of Feldenkrais Awareness Through Movement in Dance Training." *Journal of Dance Education* 8, no. 3: 79-93. http://dx.doi.org/10.1080/15290824.2008.10387362.

Dils, Ann, and Ann Cooper Albright. 2001. *Moving History/Dancing Cultures.* Middletown, CT: Wesleyan University Press.

Dimon, Theodore. 2008. *Anatomy of a Moving Body: A Basic Course in Bones, Muscles and Joints,* 2nd ed. Berkeley, CA: North Atlantic Books.

Dowd, Irene. 1981. *Taking Root to Fly: Articles on Functional Anatomy,* 3rd ed. New York, NY: Irene Dowd.

Dragon, Donna. 2015. "Creating Cultures of Teaching and Learning: Conveying Dance and Somatic Education Pedagogy." *Journal of Dance Education* 15: 25-32.

Ehrenberg, Shantel. 2015. "A Kinesthetic Mode of Attention in Contemporary Dance Practice." *Dance Research Journal* 47, no. 2: 43-62. http://dx.doi.org/10.1017/SO149767715000212.

Enghauser, Rebecca. 2003. "Motor Learning and the Dance Technique Class." *Journal of Dance Education* 3, no. 3: 87-95.

Feldenkrais, Moshe. 1972. *Awareness Through Movement: Health Exercise for Personal Growth*, Ill. ed. New York, NY: Harper and Row Publishers, Inc.

Feldenkrais, Moshe. 2010. “Mind and Body.” In *Embodied Wisdom: The Collected Papers of Moshe Feldenkrais.* Edited by Elizabeth Beringer 27-44. Berkeley, CA: North Atlantic Books.

Fitt, Sally Sevey. 1996 . *Dance Kinesiology.* 2nd ed. New York: London: Schirmer Books; Collier Macmillan.

Fortin, Sylvie, and Daryl Siedentop. 1995. “The Interplay of Knowledge and Practice in Dance Teaching: What We Can Learn from a Non-Traditional Dance Teacher.” *Dance Research Journal* 27, no. 2: 3-15. Accessed on November 4, 2015. http://www.jstor.org/stable/1478017.

Fortin, Sylvie, Warwick Long, and Madeline Lord. 2002. “Three Voices: Researching How Somatic Education Informs Contemporary Dance Technique Classes.” *Research in Dance Education* 3, no. 2: 155-179. http://dx.doi.org/10.1080/1464789022000034712.

Goodnight, Caroline. 2008. “The Value of Somatics and Dance Kinesiology and the Relationships between them: Interviews with Experts.” Unpublished Master’s thesis. University of Oregon, Eugene, OR.

Geber, Pamela, and Margaret Wilson. 2010. “Teaching at the Interface of Dance Science and Somatics.” *Journal of Dance Medicine and Science* 14, no. 2: 50-57.

Hackney, Peggy. 2005. *Making Connections: Total Body Integration through Bartenieff Fundamentals*[sm]*,* E-Library ed. New York, NY: Routledge, Taylor and Francis.

Hagood, Thomas. 2000. *A History of Dance in American Higher Education: Dance and the American University.* Lewiston, NY: E. Mellen Press.

Hancock, Dianne. 2015. “Teaching the Feldenkrais Method in UK Higher Education Performer Training.” *Theatre, Dance and Performance Training* 6, no. 2: 159-173. http://dx.doi.org/10.1080.19443927.2015.1043468.

International Somatic Movement Education and Therapy Association. 2017. “The Field of Somatic Movement Education and Therapy.” Accessed May 29, 2017. www.ismeta.org.

Kaminkoff, Leslie. 2011 “Simple Principles of the Spine.” YouTube video. 5:01. For yogaanatomy.net. Posted by “YogaAnatomy.” January 17, 2011. https://youtu.be/NPXCI53DD3 I?list=PLdHf8_6uSjySwu11M98we8CjZGq8Nmm3m.

Krasnow, Donna, and Steven J. Chatfield. 1996. “Dance Science and the Dance Technique Class.” *Impulse* 4, no. 2: 162-171.

Krasnow, Donna, and Steven J. Chatfield. 2009. "Development of the 'Performance Competency Evaluation Measure': Assessing Qualitative Aspects of Dance Performance." *Journals of Dance Medicine and Science* 13, no. 4: 101-107. Accessed on January 20, 2016. Academic OneFile.

Krasnow, Donna, and M. Virginia Wilmerding. 2015. *Motor Learning and Control for Dance: Principles and Practices for Performers and Teachers.* Champaign, IL: Human Kinetics.

Lester, Kelly Ferris. 2017. "Somatics: A Buzzword Defined." *Journal of Dance Education* 17, no. 1: 31-33.

Lester, Kelly Ferris. 2015. "Environments for Self-Learning" in *Moving Consciously: Somatic Transformations through Dance, Yoga, and Touch*. Edited by Sondra Fraleigh, 93–108. Chicago: University of Illinois Press.

Marshall, Catherine, and Gretchen B. Rossman. 1995. *Designing Qualitative Research,* 2nd ed. Thousand Oaks, CA: Sage Publications.

Meenan, Melanie. 2013. "Exploring the Modern Dance Class as a Somatic Practice." Unpublished Master's thesis. University of Oregon, Eugene, OR.

Myers, Thomas. 2014. *Anatomy Trains: Myofascial Meridians for Manual and Movement Therapists,* 3rd ed. New York, NY: Churchill, Livingstone, Elsevier.

Olsen, Andrea. 1991. *Bodystories: A Guide to Experiential Anatomy.* Barrytown, NY: Station Hill Press.

Ranganathan, Rajiv, Chandramouli Krishnan, Yasin Y. Dhaher, and William Z. Rymer. 2016. "Learning New Gait Patterns: Exploratory Muscle Activity During Motor Learning is Not Predicted by Motor Modules." *Journal of Biomechanics* 49, no. 5: 718-725.

Roche, Jenny, and April Huddy. 2015. "Creative Adaptations: Integrating Feldenkrais Principles in Contemporary Dance Technique to Facilitate the Transition Into Tertiary Dance Education." *Theatre, Dance and Performance Training* 6, no. 2: 145-158. http://dx.doi.org/10.1080/19443927.2015.1027452.

Rosalie, Simon M., and Sean Müller. 2012. "A Model for the Transfer of Perceptual-Motor Skill Learning in Human Behaviors." *Research Quarterly for Exercise and Sport* 83, no. 3: 413-421. Accessed February 15, 2015. Proquest Social Sciences Premium Collection.

Salk, Jennifer. 2005. "Teaching Modern Technique through Experiential Anatomy." *Journal of Dance Education* 5, no. 3: 97-102.

Schupp, Karen, and Karen Clemente. 2010. "Bridging the Gap: Helping Students from Competitive Dance Training Backgrounds Become Successful Dance Majors." *Journal of Dance Education* 10, no. 1: 25-28.

Stanton, Erica. 2011. "Doing, Re-doing and Undoing: Practice, Repetition, and Critical Evaluation as Mechanisms for Learning in a Dance Technique Class 'Laboratory.'" *Theatre, Dance and Performance Training* 2, no. 1: 86-98. http://dx.doi.org/10.1080.19443927.2011.545253.

Strauss, Marc, and Myron Howard Nadel. 2012. *Looking at Contemporary dance: A Guide for the Internet Age.* Highstown, NJ: Princeton Book Company.

Warburton, Edward. 2011. "Of Meanings and Movements: Re-Languaging Embodiment in Dance Phenomenology and Cognition." *Dance Research Journal* 43, no. 2: 65-78. http://dx.doi.org/10.1017/S0149767711000064.

Willingham, Daniel. 1998. "A Neuropsychological Theory of Motor Skill Learning." *Psychological Review* 105, no. 3: 558-584. Accessed March 13, 2017, American Psychological Association, Inc.

Wilson, Margaret. 2007. "Knowing in the Body: A Dancer's Emergent Epistemology." Unpublished Doctoral dissertation. Texas Women's University, Denton, TX.

Wilson, Margaret, and Young-Hoo Kwon. 2008. "The Role of Biomechanics in Understanding Dance Movement: A Review." *Journal of Dance Medicine and Science* 12, no. 3:108-114. Academic OneFile.

Wilson, Margaret. 2009. "Dance pedagogy case studies: A Grounded Theory Approach to Analyzing Qualitative Data." *Research in Dance Education,* 10, no. 1: 3-16. http://dx.doi.org/10.1080/14647890803697148.

Wulf, Gabriele, Charles Shea, and Rebecca Lewthwaite. 2010. "Motor Skill Learning and Performance: A Review of Influential Factors." *Medical Education* 44: 75-84. Accessed February 15, 2015. http://dx.doi.org.10.1111/j.1365-2923.2009.03421.x.